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ABSTRACT

This program guide identifies particular considerations in the organization, operation, and evaluation of landscape operations and landscape technology programs. Contents include information on the following: program content and structure, including program description, job titles, licensure and credentialing, and program structure; curriculum frameworks that details major concepts, content, laboratory activities, and intended outcomes; lists of student performance standards in landscape operations and landscape technology; and facilities (design criteria and suggested equipment and supplies). A format for a student learning guide and student organization participation are suggested to aid in program implementation. Information on teacher standards and technical updating and addresses of professional organizations and support services are provided. An instructional resources section lists print, audiovisual, and computer software resources; sources for instructional materials; and Florida Educational Information Service services. An appendix contains a sample student learning guide with lists of references and tools and equipment, objectives, information sheets, activity sheets, learning activities, self checks with answer keys, and tests. Two Career Merit Achievement Plans are attached. They display the student performance standards required for entry into the fields of landscape technology and landscape operations and provide for documentation of students' level of achievement. (YLB)

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FLORIDA VOCATIONAL
PROGRAM GUIDE FOR

LANDSCAPE OPERATIONS AND LANDSCAPE TECHNOLOGY

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PROGRAM GUIDE FOR

LANDSCAPE OPERATIONS AND LANDSCAPE TECHNOLOGY

State of Florida
Department of Education
Tallahassee, Florida
Betty Castor, Commissioner
Affirmative action/equal opportunity employer

Division of Vocational, Adult, and Community Education
Bureau of Vocational Program and Staff Development

July 1989

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INTRODUCTION

The Florida Vocational Program Implementation Guide can be applied to all vocational programs in Florida. This program guide, however, was developed specifically for the Landscape Operations and Landscape Technology programs to provide information that will be useful to local school-district and community-college administrators, faculty and instructors, program advisory committee members, regional coordinating councils, regional criminal justice training centers, and others charged with the responsibility of offering vocational education programs. The final planning and evaluation of any educational program, however, must be done within the context of local conditions. This publication will serve to identify the major concerns that should be considered in the organization, operation, and evaluation of a vocational education program.

Vocational education has evolved to meet the needs of students desiring to pursue selected careers or vocations. In general, vocational education is designed to provide programs, services, and activities that are realistic in light of present and future employment opportunities. In recent years, applications of science and technology have expanded rapidly, increasing the education and training required of personnel. The new technologies require many additional technical supportive staff to carry out both standardized and specialized procedures.

Today, vocational education is an increasingly viable option for students. The Florida Department of Education (DOE) shares with business, government, and industry the determination to provide opportunities for upward mobility to as many Floridians as possible. For this to become a reality, exemplary career educational programs must be created and these programs must be consistent throughout the state.

State Board of Education Administrative Rule 6A-10.24: Articulation between universities, community colleges, and school districts outlines steps and guidelines that will bring about a systematic interrelationship among Florida institutions offering similar or related courses and programs. The rule states, in part, that

> when a student transfers among postsecondary vocational-technical centers, community colleges, and universities, the receiving institution shall award credit for courses satisfactorily completed at the previous institutions when the courses are judged to be equivalent to courses offered at the receiving institution.

This program guide helps ensure that equivalency. Throughout Florida, vocational programs, if implemented according to the criteria described in this document, will help many citizens fill an important place in our state and national work force.

PROGRAM CONTENT AND STRUCTURE

The content of the Landscape Operations and Landscape Technology programs is based on occupational competencies and employability skills required on the job in Landscape Operations and Landscape Technology. The basic content of these programs is described in the Florida Curriculum Frameworks and Student Performance Standards (SPSs). To meet the local needs of the work force, the SPSs may be modified by local education agencies.

Students enrolled in these programs should be able to benefit from the instructional content with reasonable expectations for entry-level employment upon successful completion of the program.

This section includes a program description and job titles in Landscape Occupations, information on licensure and credentialing, program structure in relation to other programs in the horticulture area, and the Curriculum Frameworks and Student Performance Standards for Landscape Operations and Landscape Technology.

Program Description

Agribusiness and Natural Resources Education (ANRE) is a group of planned, specialized instructional programs structured to enable students to begin and to refine prescribed competencies required for employment in a cluster of Agribusiness and Natural Resources occupations.

The Landscape Operations and Landscape Technology programs in ANRE include learning experiences, both classroom and practical, that are concerned with providing students with an initial exposure to the skills and attitudes associated with a career in landscape business and industry.

The skills and attitudes that are basically related to producing, processing, and marketing plants, shrubs, and trees used principally for ornamental, recreational, aesthetic, and functional purposes are indicated as intended outcomes in the Curriculum Frameworks of this guide.

Job Titles

Job titles for Landscape Occupations are listed below. There are usually three levels within each job title, but not within Contractor. The three levels are: foreman, supervisor, and manager.

Gardener
Interiorscape Contractor
Interiorscape Designer
Interiorscape Installer
Interiorscape Maintainer
Landscape Contractor (182.167-014)
Landscape Designer (466.134-014)
Landscape Gardener (408.161-010)

Landscape Installer
Landscape Maintainer (408.161-010)
Landscaper (408.161-010)
Park Worker (406.134-014)
Special Effects (406.381-010)

Licensure and Credentialing

The jobs listed above do not require special licensure or certification, and advancement to supervisor and to manager within an occupation depends on experience, aptitude, attitude, and training.

However, students who have completed the Landscape Operations and Landscape Technology programs can be certified as nursery professionals by passing the certifying examination offered by the Florida Nursery Growers Association (FNGA) or can be licensed as restricted pesticide applicators by passing examinations administered by the Cooperative Extension Service through the Florida Department of Agriculture and Consumer Services. Students who have completed the Landscape Operations and Landscape Technology programs and who are interested in Landscape Maintenance or Landscape Installation can be certified by the Landscape Maintenance Association.

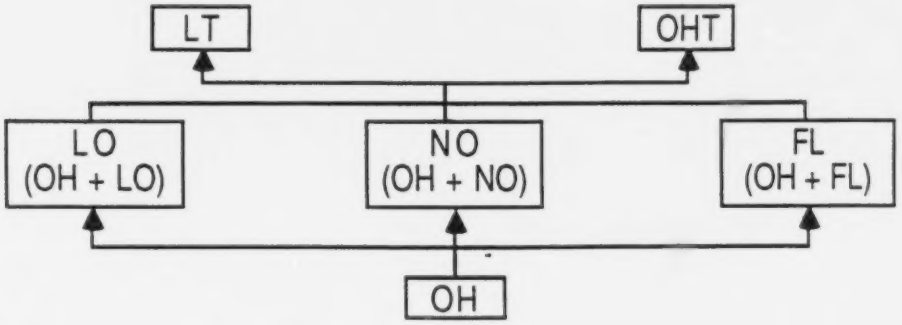
Program Structure

The cluster of horticulture programs consists of Ornamental Horticulture (OH), Floriculture (FL), Nursery Operations (NO), and Landscape Operations (LO). These programs include content that is common to all of them. This common content makes up the Ornamental Horticulture program, which is a three-credit program at the secondary level and a 450-hour program at the postsecondary adult level. It is a job-preparatory program as well as a preparatory program for the other horticulture-related programs.

The Floriculture program consists of the Ornamental Horticulture program and a three-credit (or 450-hour) Floriculture course; the Landscape Operations program consists of the Ornamental Horticulture program and a three-credit (or 450-hour) Landscape Operations course; and the Nursery Operations program is made up of the Ornamental Horticulture program and a three-credit (or 450-hour) Nursery Operations course. Therefore, those students who have completed the Ornamental Horticulture program and then enrolled in any of the three related programs (Floriculture, Landscape Operations, or Nursery Operations) can skip the first half of the program and study only the program-specific second half. Those students who have completed any one of these three programs and then enrolled in one of the other two programs can skip the first half of the program also.

(Associate degree programs in Landscape Technology and Ornamental Horticulture Technology are offered at community colleges.)

A relationship among these horticulture-related programs is depicted as follows:



Test Item Bank

A bank of multiple-choice test items was developed to measure students' achievement on the SPSs of the Nursery Operations program. Although these items are not designed to measure either the Landscape Operations SPSs or the Landscape Technology SPSs, you may find them helpful in developing tests for these programs. Since the test items were developed based on the 1987 version of the Nursery Operations SPSs and since the Nursery Operations SPSs were updated for 1989, you must check the test items you want to use for your program to make sure that they match your current SPSs. For information on how to obtain these test items, contact the Occupations Program Director, (904) 488-0482, or your Regional Program Specialist.

Curriculum Frameworks and Student Performance Standards

The Curriculum Frameworks and Student Performance Standards provided on the following pages are for the Landscape Operations and Landscape Technology programs. These SPSs are suggested but not required. It is strongly recommended that you and your program advisory committee review and revise them to meet your community's work-force needs.

Career MAPs display the SPSs in such a way that you evaluate and record students' levels of achievement on the SPSs. If you revise the SPSs listed in the Vocational Education Program Courses Standards as well as on the following pages, you must also change the MAPs so that the SPSs and the MAPs match each other. The Career MAPs are designed for students to keep their records and to present them to the prospective employers for evidence of their attainment of skills and knowledge.

The Curriculum Framework--effective July, 1989--which appears on the following pages, indicates that a student takes Landscape Operations courses 1-6. However, this will change in 1990, when the program will consist of the following:

8121310 Ornamental Horticulture 1
8121320 Ornamental Horticulture 2
8121330 Ornamental Horticulture 3
8121110 Landscape Operations 1
8121120 Landscape Operations 2
8121130 Landscape Operations 3

CURRICULUM FRAMEWORK FLORIDA DEPARTMENT OF EDUCATION

PROGRAM AREA: Agriculture

EFFECTIVE DATE: July, 1989

PROGRAM TITLE: Landscape Operations

CODE NUMBER: Secondary 8121100 Postsecondary ORV0215

Florida CIP 0101.060500

SECONDARY SCHOOL CREDITS: 6 COLLEGE CREDITS: ____

POSTSECONDARY ADULT VOCATIONAL CREDITS: ____

APPLICABLE LEVELS: ___ 7-9 ___ 9-12 x Other 10-12, 30, 31
___ Postsecondary Adult Vocational
___ Postsecondary Vocational

CERTIFICATION COVERAGE:

VOC AGRI @4 HORTICULT #7	AGRI @4 AGRICULTUR 1, 2
VOC AGRI @4 HORTICULT 7	AGRI @2, @4 AGRICULTUR 1, 2

1. **Major Concepts/Content.** The purpose of this program is to prepare students for employment as gardeners/groundkeepers--but not farm (80001400)--landscape gardeners (408.161-010), supervisors, park workers (406.134-014), landscape contractors (182.167-014), landscape installers, and landscape maintainers; or to provide supplemental training for persons previously or currently employed in these occupations.

   The content includes, but is not limited to, instruction that prepares individuals to locate, plant, and maintain turf plants and shrubs, construct and install structures and conveniences, supervise workers, prepare sites, maintain tools and equipment, control pests, fertilize, and irrigate and design exterior and interior plantings. Subject matter also includes laws and regulations, as well as leadership, employability, communication, and human relations skills.

   Listed below are the courses that comprise this program when offered at the secondary level:

   8121110 Landscape Operations 1
   8121120 Landscape Operations 2
   8121130 Landscape Operations 3
   8121140 Landscape Operations 4
   8121150 Landscape Operations 5
   8121160 Landscape Operations 6

II. **Laboratory Activities.** Agricultural shop and landscape land laboratory activities are an integral part of this program, including the safe use of mechanics' hand tools, hand and portable carpentry power tools, landscape gardening tools, arc welders, oxyacetylene torches, tractors and landscape equipment, chemical applicators, and power sprayers.

III. **Special Note.** Future Farmers of America (secondary) and the National Postsecondary Agricultural Student Organization (postsecondary) are the appropriate vocational student organizations for providing leadership training and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

Planned and supervised occupational activities must be provided through one or more of the following: (1) directed laboratory experience, (2) student projects, (3) placement for experience, and (4) cooperative experience.

Because of the production and marketing cycle of the landscaping industry, this program requires individual instruction and supervision of students for the entire period beyond the 180-day school year.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher, and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills, and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Section 233.0695, F.S., the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 6.0, Language 7.0. This grade level number corresponds to a grade equivalent score obtained on a state-designated basic skills examination.

The typical length of this program for the average achieving student is 900 hours.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **Intended Outcomes.** After successfully completing this program, the student will be able to:

01. Demonstrate an understanding of the horticulture industry.
02. Describe plant physiology and growth.
03. Identify and classify plants.
04. Propagate plants.
05. Identify growing media and apply fertilizers.
06. Irrigate plants and turfs.

07. Control pests.
08. Demonstrate pruning skills.
09. Harvest, transport, and install plant materials.
10. Operate, repair, and maintain tools and equipment.
11. Keep records.
12. Demonstrate employability skills.
13. Design and sell projects (landscape and interiorscape).
14. Prepare estimate and establish contracts.
15. Analyze and organize the project.
16. Lay out and install landscape and interiorscape.
17. Maintain landscapes and equipment.
18. Maintain customer relations and observe follow-up procedures.

STUDENT PERFORMANCE STANDARDS | EFFECTIVE DATE: July, 1989

PROGRAM AREA: Agriculture | SECONDARY NUMBER: 8121100

PROGRAM TITLE: Landscape Operations | POSTSECONDARY NUMBER: ORV0215

01.0 DEMONSTRATE AN UNDERSTANDING OF THE HORTICULTURE INDUSTRY--The student will be able to:

- 01.01 Identify fields of endeavor.
- 01.02 Describe economic importance.
- 01.03 Describe environmental importance.
- 01.04 Identify employment opportunities.
- 01.05 Describe regulatory aspects.
- 01.06 Identify continuing education opportunities.
- 01.07 Identify professional organizations and trade journals in the horticulture industry.

02.0 DESCRIBE PLANT PHYSIOLOGY AND GROWTH--The student will be able to:

- 02.01 Describe woody and herbaceous plants.
- 02.02 Identify parts of the plant.
- 02.03 Describe the process of photosynthesis.
- 02.04 Describe the basic functions of roots, stems, and leaves.
- 02.05 List the requirements for healthy plant growth.
- 02.06 Identify taproot and fibrous root systems.
- 02.07 Identify the difference between evergreen and deciduous plants.

03.0 IDENTIFY AND CLASSIFY PLANTS--The student will be able to:

- 03.01 Classify plants as monocots or dicots.
- 03.02 Identify plants according to scientific and common name.
- 03.03 Classify plants as annuals, biennials, and perennials.
- 03.04 Identify plants appropriate to a region.
- 03.05 List environmental preference of plants (shade, sun, wind, moisture, salt, etc.).
- 03.06 Classify plants according to growth habit.

04.0 PROPAGATE PLANTS--The student will be able to:

- 04.01 Identify asexual and sexual plant propagation methods.
- 04.02 Prepare propagation media.
- 04.03 Select and collect propagation materials.
- 04.04 Demonstrate propagation by seeding, grafting, budding, layering, separation, division, and cutting.
- 04.05 Demonstrate environmental controls for propagation materials (moisture, temperature, light).
- 04.06 Transplant rooted propagation materials.
- 04.07 Identify propagating and growing facilities and structures.

05.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS--The student will be able to:

05.01 Identify soil and media materials.
05.02 Identify types and kinds of fertilizer.
05.03 Identify methods of distributing fertilizers.
05.04 Interpret analysis of fertilizer from information on tag or container.
05.05 Identify symptoms of nutritional deficiencies of plants.
05.06 Collect a soil sample for soil analysis.
05.07 Determine fertilization requirements of plant materials.
05.08 Determine a fertilizer schedule.
05.09 Apply fertilizer and soil amendments.
05.10 Apply special fertilization methods appropriate to a region or plant group.
05.11 Determine rate of fertilizer applications.
05.12 Recognize symptoms of fertilizer burn.
05.13 Clean and store fertilizer application unit.
05.14 Maintain fertilization records.

06.0 IRRIGATE PLANTS AND TURFS--The student will be able to:

06.01 Identify water needs of plants.
06.02 Identify irrigation components and types of systems.
06.03 Identify sources of water for irrigation.
06.04 Install irrigation systems with control valves and clocks.
06.05 Install drainage system and identify drainage components for different types of drainage systems.
06.06 Irrigate plants.
06.07 Repair irrigation systems.

07.0 CONTROL PESTS--The student will be able to:

07.01 Classify insects according to feeding habits.
07.02 Identify common insects and diseases of plants.
07.03 Describe life cycle of insects, pests, and diseases.
07.04 Describe methods (biological, chemical, and cultural) of controlling plant insects and diseases.
07.05 Report insect and disease damage.
07.06 Interpret information on a pesticide or agricultural chemical label.
07.07 Interpret and use spray compatibility chart.
07.08 Comply with local, state, federal, and EPA regulations regarding pesticide use.
07.09 Select, mix, and apply pesticides according to the product label.
07.10 Clean, adjust, and calibrate spray equipment.
07.11 Store and dispose of pesticide containers legally.
07.12 Maintain pesticide records.
07.13 Describe symptoms of pesticide poisoning and identify first aid required.
07.14 Determine appropriate time to apply chemicals.
07.15 Select and identify pesticides according to controlling action (stomach, contact, systemic).

08.0 DEMONSTRATE PRUNING SKILLS--The student will be able to:

08.01 Identify methods of pruning plants to achieve desired growth and maintain health.
08.02 Identify and select pruning tools for the task.
08.03 Identify appropriate time to prune plants.
08.04 Root-prune appropriate plants.
08.05 Prune plants for desired shape and growth.
08.06 Identify and select chemical growth regulators.
08.07 Identify means of sterilizing pruning tools.

09.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS--The student will be able to:

09.01 Select and prepare field-grown and container plants for transportation and transplanting.
09.02 Determine requirements for preserving plant viability.
09.03 Install ornamental plants per a landscape plan.

10.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

10.01 Identify, operate, and maintain small gasoline engines.
10.02 Identify, operate, and maintain hand tools and power tools.
10.03 Perform equipment preoperational check before use.
10.04 Identify, operate, and maintain tractor and power equipment.
10.05 Load, secure, and transport equipment.
10.06 Demonstrate safety precautions while working with tools and equipment.

11.0 KEEP RECORDS--The student will be able to:

11.01 Keep fertilizer and pesticide application records.
11.02 Keep equipment maintenance and service records.
11.03 Keep job records, daily log sheets, and inventory.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents that may be required when applying for a job.
12.04 Complete a job application form correctly.
12.05 Demonstrate competency in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.

13.0 DESIGN AND SELL PROJECTS (LANDSCAPE AND INTERIORSCAPE)--The student will be able to:

13.01 Confer with customer regarding special requests and needs.
13.02 Analyze environmental conditions of the site for the project.

13.03 Identify plant materials appropriate for the project.
13.04 Determine the desired effect and purpose of the project.
13.05 Design the project.
13.06 Present the design.

14.0 PREPARE ESTIMATE AND ESTABLISH CONTRACTS--The student will be able to:

14.01 Develop a list of materials required for the project.
14.02 Determine equipment needs.
14.03 Estimate time and man hours.
14.04 Determine costs of materials, equipment, and labor.
14.05 Prepare a price for customer based on specifications.
14.06 Establish terms of a contract.

15.0 ANALYZE AND ORGANIZE THE PROJECT--The student will be able to:

15.01 Interpret plans and specifications.
15.02 Identify safety requirements.
15.03 Organize site preparation.
15.04 Locate project materials.
15.05 Determine personnel needs.
15.06 Determine equipment needs.
15.07 Establish project schedule.

16.0 LAY OUT AND INSTALL LANDSCAPE AND INTERIORSCAPE--The student will be able to:

16.01 Locate existing utilities.
16.02 Rough-grade the site.
16.03 Determine procedures for installing large materials.
16.04 Install irrigation system.
16.05 Describe procedures for constructing hardscape (walls, walks, patio, drives, etc.).
16.06 Lay out and install plants.
16.07 Prepare interiorscape.
16.08 Prepare final grade.
16.09 Install lawns and turfs.
16.10 Install mulch and perform final cleanup.

17.0 MAINTAIN LANDSCAPES AND EQUIPMENT--The student will be able to:

17.01 Determine water requirements and apply at proper rates.
17.02 Identify weeds and apply herbicides safely.
17.03 Determine fertilization requirements and apply at proper rates.
17.04 Identify plant-pest, insect, and disease problems and apply corrective measures.
17.05 Trim and prune landscape plants.
17.06 Maintain turf viability: mow at proper height and frequency, aerate, edge, clip, and remove trash.
17.07 Cultivate and mulch plants.
17.08 Brace and repair trees.
17.09 Provide protection for plants from adverse weather conditions.
17.10 Select, operate, and maintain landscape equipment.

17.11 Comply with local, state, and federal regulations regarding landscape maintenance.
17.12 Demonstrate sanitation and safety practices when maintaining landscape.

18.0 MAINTAIN CUSTOMER RELATIONS AND OBSERVE FOLLOW-UP PROCEDURES--The student will be able to:

18.01 Conduct walk-through of project with client to assure satisfaction.
18.02 Identify current and future maintenance requirements.
18.03 Analyze project records for profitability and employee performance.

CURRICULUM FRAMEWORK
FLORIDA DEPARTMENT OF EDUCATION

PROGRAM AREA: Agriculture

EFFECTIVE DATE: July, 1989

PROGRAM TITLE: Landscape Technology

CODE NUMBER: Secondary _____ Postsecondary 0101.060501

Florida CIP 0101.060501

SECONDARY SCHOOL CREDITS: _____ COLLEGE CREDITS: x

POSTSECONDARY ADULT VOCATIONAL CREDITS: _____

APPLICABLE LEVELS: ___ 7-9 ___ 9-12 ___ Other _____
___ Postsecondary Adult Vocational ___ Postsecondary Vocational

CERTIFICATION COVERAGE:

I. **Major Concepts/Content.** The purpose of this program is to prepare students for employment as landscape contractors (182.167-014), landscape gardeners (408.161-010), landscapers (408.161-010), landscape designers, supervisors, park workers (406.134-014), gardeners, special effects (406.381-010); or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, instruction that prepares individuals to supervise, manage, and design exterior and interior landscapes. Subject matter also includes plant identification, disease and insect control, plant nutrition, irrigation, laws and regulations, and record keeping, as well as leadership, employability, communication, and public and human relations skills.

II. **Laboratory Activities.** Agricultural shop and land laboratory activities are an integral part of this program, including the safe use of mechanics' hand tools, landscaping hand tools, hand and portable carpentry power tools, arc welders, oxyacetylene torches, power sprayers, chemical applicators, tractors, and landscaping equipment.

III. **Special Note.** The National Postsecondary Agricultural Student Organization is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills.

Planned and supervised occupational activities must be provided through directed laboratory experience, practicum, or cooperative experience. Whenever the cooperative method of instruction is offered, the following is required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills, and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

The typical length of this program for the average achieving student is an associate degree.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **Intended Outcomes.** After successfully completing this program, the student will be able to:

01. Analyze and design the project (landscape and interiorscape).
02. Prepare estimate and establish contracts.
03. Analyze and organize the project.
04. Lay out and install landscape and interiorscape.
05. Plan, install, and service an irrigation system.
06. Plan and install a drainage system.
07. Maintain customer relations and observe follow-up procedures.
08. Maintain landscape plants.
09. Manage a pest control program.
10. Protect plants and equipment from adverse weather.
11. Select, operate, and maintain landscape tools and equipment.
12. Keep records.
13. Demonstrate managerial and supervisory skills.
14. Demonstrate employability skills.
15. Demonstrate leadership, communication, and human relations skills.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1989

PROGRAM AREA: Agriculture SECONDARY NUMBER: _____

PROGRAM TITLE: Landscape Technology POSTSECONDARY NUMBER: 0101.060501

01.0 ANALYZE AND DESIGN THE PROJECT (LANDSCAPE AND INTERIORSCAPE)--The student will be able to:

01.01 Determine the purpose, problems, or desired effect of the project.
01.02 Analyze the environmental conditions of the landscape or interiorscape.
01.03 Determine site-analysis problems.
01.04 Demonstrate working knowledge of computer-assisted drafting (CAD) system.
01.05 Design hardscape plan.
01.06 Design and select appropriate plant materials for desired effect and function.
01.07 Determine the method and form of presentation of the project.

02.0 PREPARE ESTIMATE AND ESTABLISH CONTRACTS--The student will be able to:

02.01 Develop a list of materials required for the project.
02.02 Determine equipment needs.
02.03 Estimate time and work hours.
02.04 Determine costs of materials, equipment, and labor.
02.05 Prepare a price for customer, based on specifications.
02.06 Establish terms of a contract.

03.0 ANALYZE AND ORGANIZE THE PROJECT--The student will be able to:

03.01 Interpret plans and specifications.
03.02 Identify safety requirements.
03.03 Organize site preparation.
03.04 Locate project materials.
03.05 Determine personnel needs.
03.06 Determine equipment needs.
03.07 Establish project schedule.

04.0 LAY OUT AND INSTALL LANDSCAPE AND INTERIORSCAPE--The student will be able to:

04.01 Locate existing utilities.
04.02 Rough-grade the site.
04.03 Install large materials.
04.04 Install an irrigation system.
04.05 Construct hardscape (walls, walks, patio, drives, etc.).
04.06 Lay out and install plants.
04.07 Prepare interiorscape.

04.08 Prepare final grade.
04.09 Install lawns.
04.10 Install mulch.
04.11 Perform final cleanup.

05.0 PLAN, INSTALL, AND SERVICE AN IRRIGATION SYSTEM--The student will be able to:

05.01 Determine irrigation requirements.
05.02 Assess quality of irrigation water.
05.03 Plan an irrigation system.
05.04 Supervise the installation of irrigation equipment.
05.05 Service and maintain electric- and engine-driven pumps.
05.06 Operate and service a low-volume irrigation system.
05.07 Operate and service an overhead irrigation system.
05.08 Operate and maintain an automatic system.
05.09 Calculate cost efficiency of an irrigation system.

06.0 PLAN AND INSTALL A DRAINAGE SYSTEM--The student will be able to:

06.01 Determine the natural slope/grade of an area.
06.02 Determine the texture and percolation characteristics of the soil.
06.03 Identify techniques for constructing ditches and culverts.
06.04 Direct the movement of water away from structures and installations.
06.05 Plan the construction of an underground drainage system.
06.06 Estimate and order appropriate fill materials.
06.07 Establish proper elevations and grade a landscape site.
06.08 Read soils and contour maps.

07.0 MAINTAIN CUSTOMER RELATIONS AND OBSERVE FOLLOW-UP PROCEDURES--The student will be able to:

07.01 Conduct walk-through of project with client to assure satisfaction.
07.02 Identify current and future maintenance requirements.
07.03 Analyze project records for profitability and employee performance.

08.0 MAINTAIN LANDSCAPE PLANTS--The student will be able to:

08.01 Determine water requirements and apply at proper rates.
08.02 Identify weeds and apply herbicides safely.
08.03 Determine fertilization requirements and apply at proper rates.
08.04 Identify plant pest problems and apply corrective measures.
08.05 Regulate the growth of landscape plants through chemical or mechanical means.
08.06 Maintain turf viability (mow at proper height and frequency, aerate, edge, clip, and remove trash).
08.07 Cultivate and mulch plants.
08.08 Brace and repair trees.

09.0 MANAGE A PEST CONTROL PROGRAM--The student will be able to:

09.01 Develop an integrated pest management program or schedule.
09.02 Train workers in the safe use of pesticides.
09.03 Obtain a restricted-use pesticide license.

10.0 PROTECT PLANTS AND EQUIPMENT FROM ADVERSE WEATHER--The student will be able to:

10.01 Monitor and interpret weather forecasts.
10.02 Supervise procedures for protecting plants and equipment from adverse weather.
10.03 Compare cost and efficiency of various methods of protecting plants and equipment from adverse weather.

11.0 SELECT, OPERATE, AND MAINTAIN LANDSCAPE TOOLS AND EQUIPMENT--The student will be able to:

11.01 Determine equipment needs for the company.
11.02 Select and operate equipment for the job.
11.03 Supervise the service and maintenance of power equipment.
11.04 Supervise the repair and maintenance of facilities.
11.05 Instruct and supervise employees in the safe use of tools and equipment.
11.06 Maintain an inventory of parts and supplies.

12.0 KEEP RECORDS--The student will be able to:

12.01 Keep fertilizer and pesticide application records.
12.02 Keep equipment maintenance and service records.
12.03 Keep sales and production records.
12.04 Record labor and personnel information.
12.05 Keep inventory records.
12.06 Analyze cost and effectiveness of management practices.
12.07 Determine insurance needs.
12.08 Prepare an annual budget.
12.09 Prepare a five-year projection plan.
12.10 Maintain accounts-receivable and accounts-payable records.
12.11 Describe the use of computers in landscape operation.

13.0 DEMONSTRATE MANAGERIAL AND SUPERVISORY SKILLS--The student will be able to:

13.01 Instruct employees in their tasks.
13.02 Prepare daily work plans.
13.03 Enforce safety regulations.
13.04 Evaluate performance of employees.
13.05 Develop an outline for a policy manual.
13.06 Organize and conduct employee training.
13.07 Conduct employee grievance procedures.
13.08 Prepare job descriptions.
13.09 Conduct job interviews.
13.10 Demonstrate effective communication skills.
13.11 Demonstrate computer literacy as related to landscape operation.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents that may be required when applying for a job.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make job changes appropriately.
14.09 Demonstrate acceptable employee health habits.

15.0 DEMONSTRATE LEADERSHIP, COMMUNICATION, AND HUMAN RELATIONS SKILLS--The student will be able to:

15.01 Develop citizenship awareness and responsibility.
15.02 Describe the organization, operation, and purposes of agricultural student organizations.
15.03 Organize and conduct meetings.
15.04 Demonstrate effective written and oral communication skills.
15.05 Demonstrate good interpersonal and human relations skills.

FACILITIES

This section includes facility design criteria and a list of suggested equipment and supplies.

Design Criteria

Florida State Board of Education Rule 6A-2.032 specifies the size of space and occupant design criteria that school districts must follow in planning and designing facilities for the Landscape Operations and Landscape Technology programs. However, the program guide committee recommended the following minimum-, normal-, and maximum-size facilities for a one-time occupancy design capacity of twenty students.

Program Facility	Minimum (sq. ft.)	Normal (sq. ft.)	Maximum (sq. ft.)
Office Space per Instructor	100	150	200
Landscape Laboratory	1,200	1,350	1,500
Classroom (related instruction)	500	525	550
Greenhouse	800	900	1,000
Lockers and Toilets	140	150	160
Reference	190	200	210
Storage, Flammable	165	175	185
Storage, Materials	200	400	600
Storage, Tools and Equipment	1,000	1,500	2,000
Storage, Pesticides	200	400	600

Exterior Space

Two to three acres
1,200-square-foot exterior concrete slab, fenced and covered
1,600-square-foot shadehouse

Specific Provisions

The landscape/horticulture program area should be an integral part of the total program of a school. Therefore, considerable thought and careful study should be given to locating the department, of which the Landscape Operations and Landscape Technology programs are a part. Some of the factors that should be considered are:

The department should be easily accessible.
The department should have sufficient parking spaces.
The shop should be located and designed so that it avoids disturbing the other classes.
Facilities should have adequate heating and cooling.
Facilities should be located at ground level and have good drainage.
The laboratory and classroom should be adjacent to each other.
The office space and reference space should be a separate facility within the landscape/horticulture complex.

Classroom Facilities

The following are some of the suggested facilities for the classroom:

Acoustic ceiling
Adequate duplex electrical outlets (at least four)
Adjustable shelves
Display racks for reference books and periodicals
Heating and air conditioning
Lockable cabinet for teacher use
Lockable storage cabinets
Minimum of 18 lineal feet of 36-inch chalkboard
Minimum of 32 square feet of tackboard
Operable windows with shades for light control
Rheostat lighting control
Tilt wall-mounted screen for audiovisual use
Wall clock

Laboratory Facilities

The following are some of the recommended specifications for the laboratory:

Adequate heating and cooling
Adequate lighting
Adequate windows for lighting and ventilation
Drafting tables
Lockable metal cabinets for storage
Master electrical control switch
Metal storage shelves
Minimum of 24 square feet of tackboard
Overhead doors at least 12 feet high
Pesticide storage with sump and ventilation
Separate restrooms for men and women
Sufficient 120-volt power outlets for small equipment
Sufficient 240-volt power outlets for heavy-duty equipment
Tool and equipment storage facilities
Wall clock
Walls and ceilings at least 14 feet high
Washing and drinking facilities
Work benches and tables

Suggested Equipment and Supplies

The following are some of the suggested equipment:

Auger bit sets
Battery charger
Bench, welding
Brace-rachet set
Carts, greenhouse (with pneumatic tires)
Chisel set, wood
Compressor, air
Cutter, pipe
Basket, wire
Bench, potting
Boots, protective
Buckets, water
Caulking guns
Clippers, hedge (electric)
Containers, gasoline (two 1/2-gallon)

Cutter, sod
Dial, probe-type (to 200° F)
Drafting sets
Drive socket, 1/4-inch x 3/8-inch
Edgers, cement (curved-blade)
Fertilizer spreader, shoulder-carry (Cyclone)
Flaring tool, copper
Forks, spading and manure
Funnels, utility
Gloves, protective
Goggles, clear-plastic
Greenhouse/shadehouse
Grinder, 7-inch
Grinding dressers, abrasive
Hammers, ballpeen
Hammers, sledge-
Hand truck
Harrow, disc (with 3-point hitch)
Heating cable with thermostat, electric
Hoes
Hooks, bush
Jack, hydraulic (Come-along)
Lenses, hand
Levels, carpenter's line
Mist system, automatic
Mower, rotary (21-inch push-type gasoline-powered)
Planting bars (dibbles)
Pliers set
Pot grips
Propane torch kit
Railroad picks
Rakes, grading
Respirators
Ripsaws, hand
Saw, chain
Saws, crosscut (hand)
Scale, ounce (spring)
Scraper, box (3-point hitch)
Seeder, precision (push-type)
Seed germinator, 300-watt
Shader, box (3-point hitch)
Shades (for room light control)
Shears, can
Shears, lopping
Shovels, round-point
Shredder, soil
Skid steer
Soil samplers, tube
Soldering kit
Sprayer, paint
Cutter, tubing
Diggers, posthole
Drills, 3/8-inch (portable)
Duster, rotary (hand-cranked)
Extension cords
File sets
First-aid kits
Flaring tool sets
Framing squares
Garbage cans for storage (plastic)
Grafting tools
Greenhouse sprayer, electric (25-gallon)
Hacksaws
Hammers, claw
Handsaw, electric
Hard hats, protective
Hatchets
Helmets, safety
Hoist, chain
Hoses, water (50-foot)
Ladder, extension
Level, farm (with tripod)
Lifting straps
Mixer, concrete
Overalls, protective (disposable)
Pin bars, lifting
Pliers
Plumb bob
Press, drill
Punches, can
Rakes, garden
Reamer, pipe
Respirators, mask
Rules, bench
Saw, 10-inch radial-arm table
Saws, pruning
Scale, pound (spring)
Screwdriver sets
Seed flats
Shade cloth, black (2,600-square-foot)
Sharpening stones
Shears, hedge
Shears, pruning
Shovels, square-point
Sieve, hand
Soil augers
Soil sterilizer
Spades
Sprayers, herbicide (hand)

Sprayers, herbicide (2-gallon stainless steel)
Spreader, push-type (Cyclone)
Stepladder
Tapes, steel (100-foot)
Thermometers, greenhouse (nonmercury)
Thermometer, soil
Tiller, soil
Time clock, 24-hour
Timer, interval
Tractor, with turf-type tires (30-horsepower)
Vacuum, shop
Water nozzles, Fog-it
Welder, oxyacetylene
Wrenches, pipe (10-, 14-, and 24-inch sets)
Wrench sets, box-end
Sprayers, insecticide (2-gallon stainless steel)
Squares, combination
Stereomicroscopes with lights and cases
Thermometers, high/low recording
Time clock, fast-cycle (adjustable for mist control)
Tractor, garden
Trowel
Trowel set
Vises, machinist
Welder, arc (electric)
Wheelbarrows, contractor-type
Wrench set, adjustable

PROGRAM IMPLEMENTATION

This section includes information that may aid the instructor in planning the implementation of the Landscape Operations and Landscape Technology programs: student admission requirements, a list of safety manuals, an explanation of the components of a student learning guide, cooperative training, and student organization participation.

Student Admission Requirements

In accordance with the Course Code Directory, the Landscape Operations program is offered to students at grade levels 10-12, 30, and 31. Landscape Technology is for college credit. There are no specific student admissions criteria other than those that may be required by local education agencies.

Safety and Maintenance

As a Landscape Operations or Landscape Technology instructor, you should follow the general rules for safety included in the Florida Vocational Education Program Implementation Guide. Also, you should refer to safety manuals specific to Agribusiness and Natural Resources Education such as:

Applying Pesticides
Developing Shop Safety Skills
Safety Color Coding for the Shop
American Association for Vocational Instructional Materials (AAVIM)
120 Driftmier Engineering Center
Athens, Georgia 30602

Florida Vocational Agriculture Safety Manual
Department of Agriculture and Extension Education
College of Agriculture
University of Florida
Gainesville, Florida 32611

Aerial Applicator
Agricultural Pest Control Manual
Applying Pesticides Correctly
Florida Cooperative Extension Services
Institute of Food and Agricultural Sciences
University of Florida
Gainesville, Florida 32611

Safety Instruction Manual for Programs in Agriculture Education
New York State Department of Education
Bureau of Agricultural Education
1 Commerce Plaza, Room 1619
Albany, New York 12234

For further information about safety manuals, contact the Instructional Materials Service, College of Agriculture, 305 Rolfs Hall, University of Florida, Gainesville, Florida 32611, (904) 372-0502, SUNCOM 622-0502.

Student Learning Guide

As mentioned in the Instructional Approach of the Florida Vocational Education Program Implementation Guide, competency-based vocational instruction (CBVI) is the most appropriate instructional approach to teaching students to become competent in Landscape Operations or Landscape Technology. In order to implement CBVI effectively and efficiently, you and the students should have access to competency-based instructional materials, such as student guides or modules.

A sample student learning guide is provided in the Appendix as an example for you to use when developing or adapting a set of learning guides or modules. This sample guide is not complete--it presents basic components of a competency-based student learning guide: introduction, objectives, a list of resources, learning activities, information sheets, self-check and answer sheet, activity sheets, a written test, and a performance test. An answer key to the written test is included in the instructor version of the learning guide.

The following components are often included in a student learning guide:

The **introduction,** which includes the intended outcome, the SPS for which the guide is developed, and an introduction to the guide stating why this topic is important to study and what this guide is about (Other information, such as the relationship between this guide and other guides, can also be included on this sheet.)

The **objectives,** which include both knowledge and performance objectives if the SPS calls for hands-on performance, but only knowledge objectives if the SPS requires knowledge-oriented competencies

The **list of resources,** which includes instructional materials the students should use to study and tools and supplies students should have access to in order to complete this guide

The **learning activities,** which include a list of steps students should take in order to master the objectives

An **information sheet,** which may need to be developed if the existing instructional materials do not cover enough content for students to master the objectives

The **self-check,** which consists of questions designed to help students review what they have studied (This is followed by an answer sheet.)

The **activity sheet,** which is designed to help students practice hands-on tasks for the performance objective(s) (If the SPS does not require hands-on activity, this sheet is not included in the learning guide.)

The **written test,** which is to measure the student's achievement on the knowledge objectives

The **performance test,** which is designed to be used by the instructor/evaluator to assess the student's level of achievement on the performance objectives

The student learning guide may consist of two or more sets of the above components if the objectives need to be divided into two or more groups. Whatever format you use for the student learning guide, these components should be included in order to incorporate instructional events such as

1. gaining attention
2. stating objective(s)
3. recalling prerequisites
4. providing instructional stimulus
5. providing learning guidance
6. eliciting performance
7. providing feedback
8. assessing performance
9. enhancing retention and transfer.

Cooperative Training

Cooperative on-the-job training (OJT) for Landscape Operations and Landscape Technology may be taken by a student for one or more semesters. The specific SPSs that the student should master to earn credit must be specified in the OJT plan. This plan should include a list of OJT and in-school learning experiences and should be signed by the student, instructor, employer, and cooperative program coordinator. Besides the training plan, each student should have access to a work station with relevant tools and equipment that can facilitate the student's mastery of skills and knowledge necessary for the student to function as a beginning worker in landscape business and industry.

The teacher-coordinator must visit each job site **at least** once during each grading period for the purpose of evaluating the student's progress in attaining the competencies listed in the training plan.

The student must receive compensation for work performed on the job and may earn multiple credits.

For additional information on cooperative training, refer to the Suggested Guidelines for Cooperative Agribusiness Programs in Florida, which should be available through the regional offices of the Division of Vocational, Adult, and Community Education.

Student Organization Participation

The vocational student organizations associated with the Landscape Operations and Landscape Technology programs are Future Farmers of America and the National Postsecondary Agricultural Student Organization.

FFA began early in the history of vocational education as instructors became aware of the need to provide practical training beyond the traditional classroom approach. Instruction was made more interesting through incorporating practical work experience, competitive judging events, and leadership development activi-

ties into the program. This learn-by-doing principle, the foundation of FFA, became the vehicle for providing leadership training and occupational incentive.

FFA provides leadership opportunities by challenging students with incentive awards and activities that are specifically designed to be a part of the instructional program. Members learn through active participation how to conduct and take part in public meetings, how to speak in public, and how to take leadership roles in their schools and communities. These activities encourage entrepreneurship, help make better employees, and develop responsible citizens by uniting them with leadership opportunities in agriculture and agribusiness.

Participation in FFA helps develop a sense of responsibility, the ability to work cooperatively, sportsmanship, and an increased knowledge of agribusiness.

PROFESSIONAL DEVELOPMENT

Teacher Standards and Technical Updating

Certification

LANDSCAPE OPERATIONS: Listed below are the certification coverages included in the current Course Code Directory for Agribusiness and Natural Resources Education.

VOC AGRI @4	AGRI @4
HORTICULT #7	AGRICULTUR 1, 2
VOC AGRI @4	AGRI @2, @4
HORTICULT 7	AGRICULTUR 1, 2

LANDSCAPE TECHNOLOGY: Community college instructors should meet the requirements of the individual college.

Other Qualifications

Local education agencies may qualify the instructor to teach Vocational Agriculture by having fulfilled one or more of the following requirements:

1. The teacher has obtained a regular or temporary Florida teacher's certificate with appropriate coverages.
2. The teacher has been approved by the local school board, in accordance with official school policy.
3. The teacher holds a regular or temporary Florida teacher's certificate with other than appropriate coverage, but has met all occupational experience requirements for appropriate certification and has been approved by the local school board to teach out of field.

Technical Updating

For technical and professional updating inservice activities, instructors at high schools and area vocational-technical centers should contact the district Teacher Education Center (TEC) and Agricultural Education supervisors. Community college instructors should contact the department of Program and Staff Development of the individual college.

Professional Organizations and Support Services

All-America Rose Selections
P. O. Box 218
Shenandoah, IA 51601

American Association of Nurserymen
1250 I Street, NW, Suite 500
Washington, DC 20005

American Horticultural Society
P. O. Box 0105
Mt. Vernon, VA 22121

American Nurseryman
310 S Michigan Avenue
Chicago, IL 60604

American Rose Foundation
P. O. Box 30000
Shreveport, LA 71130

American Sod Producers Association
4415 W Harrison Street
Hillside, IL 60162

BPI, A Growers Organization
P. O. Box 286
Okemos, MI 48864

Florida Flower Association
P. O. Box 1569
Ft. Myers, FL 33902

Florida Nursery Growers Association
5401 Kirkman Road, Suite 650
Orlando, FL 32819

Garden Industry of America
P. O. Box 1092
Minneapolis, MN 55440

Horticulture Awareness Association
14575 Mercury Drive
Grand Haven, MI 49417

The Irrigation Association
1911 N Fort Myer Drive, Suite 1009
Arlington, VA 22209

Landscape Nursery Council
28E Rahn Road
Dayton, OH 45429

National Equipment Servicing
Dealers Association
Box 121, E Main Street
Jefferson Valley, NY 10535

National Lawn and Garden
Distributors Association
1900 Arch Street
Philadelphia, PA 19103

North American Gladiolus Council
Commercial Growers Division
5007 60th Street, E
Bradenton, FL 34203

American Society of Agronomy
677 S Segoe Road
Madison, WI 53711

Associated Landscape Contractors
of America
405 N Washington Street
Falls Church, VA 22046

The Fertilizer Institute
1015 18th Street, NW
Washington, DC 20036

Florida Foliage Association
P. O. Box Y
Apopka, FL 32703

Florida Turfgrass Association
302 S Graham Avenue
Orlando, FL 32803-6332

Horticultural Research Institute
1250 I Street, NW, Suite 500
Washington, DC 20005

International Garden Horticultural
Industry Association
26 Pine Street
Dover, DE 19901

Landscape Maintenance Association
P. O. Box 728
Largo, FL 34649

National Association of Plant Patent
Owners
1250 I Street, NW, Suite 500
Washington, DC 20005

National Landscape Association
1250 I Street, NW, Suite 500
Washington, DC 20005

North American Flowerbulb
Wholesalers Association
P. O. Box 581
Middletown, NJ 07748

Nursery Association Executives
P. O. Box 1871
Bozeman, MT 59771

Nursery Marketing Council
1250 I Street, NW, Suite 500
Washington, DC 20005

Outdoor Power Equipment Institute
1901 L Street, NW, Suite 700
Washington, DC 20036

Planting Council
119B Great Road
Bedford, MA 01730

Roses Incorporated
1152 Haslett Road
Haslett, MI 48840

Southern Florist and Nurseryman
Reader Service Department
Box 1868
Fort Worth, TX 76101

Wholesale Nursery Growers
of America
1250 I Street, NW, Suite 500
Washington, DC 20005

Outdoor Power Equipment
Distributors Association
1900 Arch Street
Philadelphia, PA 19103

Perennial Plant Association
217 Howlett Hall
2001 Fyffe Court
Ohio State University
Columbus, OH 43210

Professional Lawn Care Association
of America
1225 Johnson Ferry Road, Suite B-220
Marietta, GA 30067

Society of American Florists
1601 Duke Street
Alexandria, VA 22314

Wholesale Florists and Florist
Suppliers of America
5313 Lee Highway
Arlington, VA 22207

INSTRUCTIONAL RESOURCES

This section lists print, audiovisual, and computer software resources. Resource materials have been identified by Florida Educational Information Service and by the committee members but have not been reviewed for their quality. Additional instructional materials may be obtained from the sources listed at the end of this section.

Print Materials

Agricultural Occupations. Education for Employment Task Lists. Grayslake, Ill.: Lake County Area Vocational Center; Springfield: Illinois State Board of Education; 1986.

Albracht, James, ed. Basic Core Curriculum Project: Horticulture I, II, and III. Pittsburg, Kans.: Pittsburg State University, 1982.

Applying Pesticides Correctly: A Guide for Private and Commercial Applicators. Gainesville: University of Florida, 1972.

Architectural Drafting Curriculum Guide. Michigan Trade and Industrial Education. East Lansing: Michigan State University; Lansing: Michigan State Department of Education; 1984.

Ball, Vic, ed. Ball Red Book. 14th ed. Englewood Cliffs, N.J.: Reston Publishing Co., 1984.

Barnard, Edward L., and Dixon, Wayne N. Insects and Diseases: Important Problems of Florida's Forest and Shade Tree Resources. Tallahassee, Fla.: Florida Department of Agriculture and Consumer Services, 1983.

Baudendistel, Robert F. Horticulture: A Basic Awareness. 2nd ed. Englewood Cliffs, N.J.: Reston Publishing Co., 1982.

Be a Building Watcher on the Street Where You Live. Indianapolis: Historic Landmarks Foundation of Indiana, 1986.

Bender, Gerald F., and Probasco, Jack F. "Include Passive Solar in Your Renovations." American School and University 53 (April 1981): 38, 40-42.

Bingaman, Charles E., ed. Florida Certified Nursery Professional Manual. Orlando: The Florida Nurserymen and Growers Association, 1984.

Biondo, Ron, et al. Core II Materials for Metropolitan Agriculture/Horticulture Programs, Units G-L. Urbana: Illinois University; Springfield: Illinois State Board of Education; 1982.

Biondo, Ron, et al. Core III Materials for Metropolitan Agriculture/Horticulture Programs, Units J-M. Urbana: Illinois University; Springfield: Illinois State Board of Education; 1982.

Bohmont, Bert L. The New Pesticide User's Guide. Reston, Va.: Reston Publishing Co., 1984.

Boodley, James W. The Commercial Greenhouse. Albany, N.Y.: Delmar Publishers, 1981.

Brickman, Dick. "How to Cut Landscape Maintenance Costs." American School and University 54 (June 1982): 28-33.

Career Preparation for Agriculture/Agribusiness. Hightstown, N.J.: McGraw-Hill Book Co., 1980.

Compact Tractor Service Manual. 2nd ed. Overland Park, Kans.: Intertec Publishing, 1986.

A Comprehensive Horticulture Curriculum Guide for New Jersey Schools. New Brunswick, N.J.: Rutgers, The State University; Trenton: New Jersey State Department of Education; 1985.

Designing the Landscape. Columbus: Ohio Agricultural Education Curriculum Materials Service, 1980.

Developing a Landscape Plan. Agricultural Occupations Curriculum. Springfield: Illinois State Board of Education, 1981.

Dig Manual: A Guide to the Identification and Selection of Florida Ornamental Plants. Tallahassee: State of Florida, 1984.

Fundamentals of Agribusiness and Natural Resources Occupations, Student Guide. Tallahassee: Florida Department of Education, 1984.

Furuta, Tokuji. Interior Landscaping. Englewood Cliffs, N.J.: Reston Publishing Co., 1982.

Geer, Barbara Farabough. Basic Horticulture. Stillwater, Okla.: Oklahoma State Department of Vocational and Technical Education, 1981.

Gould, Bryant, and Finci, David. "Site Plan: A First Step." American School and University 58 (April 1986): 60, 62, 64, 66.

Grades and Standards for Nursery Plants, Part I. 3rd ed. Gainesville: Florida Department of Agriculture and Consumer Services, 1973.

Grades and Standards for Nursery Plants, Part 2: Palms and Trees. Gainesville: Florida Department of Agriculture and Consumer Services, 1965.

Graf, Alfred B. Pictorial Cyclopedia of Exotic Plants: Exotica Series IV International. East Rutherford, N.J.: Roehrs Co., 1985.

Graf, Alfred B. Tropica: Color Encyclopedia of Exotic Plants. 3rd ed. East Rutherford, N.J.: Roehrs Co., 1986.

Gruttadaurio, Joann. Weed Science: A Teaching Guide. Ithaca, N.Y.: Cornell University, 1976.

A Guide to Safe Pest Control around the Home. Ithaca: New York State College of Agriculture and Life Sciences, 1979.

Hemp, Paul, et al. Core IV Materials for Metropolitan Agriculture/Horticulture Programs. Urbana: Illinois University; Springfield: Illinois State Board of Education; 1984.

Hill, Lewis, ed. Pruning Simplified. Pownal, Vt.: Storey Communications, 1986.

Holmes, Francis W. "How to Get Trees." American School and University 53 (April 1981): 40f.

Horticultural Competency Worksheets. St. Paul: Hobar Publications, n.d.

Horticulture: Landscape. Lansing: Michigan State Board of Education, 1985.

Hudson, Coy L. Horticulture Technology: A Competency-based Curriculum Manual. Raleigh: North Carolina Department of Community Colleges, 1979.

Implementing the Landscape Plan. Agricultural Occupations Curriculum. Springfield: Illinois State Board of Education, 1981.

Improvement of School Climate. Ridgecrest, Calif.: Sierra Sands Unified School District, 1984.

Ingels, Jack E. Landscaping: Principles and Practices. 2nd ed. Albany: Delmar Publishers, 1983.

Ingels, Jack E. Ornamental Horticulture: Principles and Practices. Albany: Delmar Publishers, 1985.

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McCann, Kevin. Selected Landscape Plants. Columbus: Ohio State Department of Education; Ohio State University, 1984.

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Computer Software

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Landscape Design. Design Your Own Home Series. Novato, Calif.: Avant-Garde, 1984.

Sources for Instructional Materials

The following organizations are sources from which you can acquire instructional materials:

Print Materials

AAVIM
120 Driftmeir Engineering Center
Athens, GA 30602

AgAccess
P. O. Box 2008
Davis, CA 95617

BLS Inc.
2503 Fair Lee Road
Wilmington, DE 19810

Chevron Chemical Company
Public Relations
P. O. Box 3744
San Francisco, CA 94119

Educators Progress Service
214 Center Street
Randolf, WI 53956

Fearon Education
David Street Lake Publishers
19 Davis Drive
Belmont, CA 94002

Horticultural Books
P. O. Box 107
Stuart, FL 33494
Attn: Edwin A. Menninger

Interstate Printers & Publishers
P. O. Box 50
Danville, IL 61834-0050

National Farm Book Company
5149 Highway T
P. O. Box 206
Amherst, WI 54406

Safety and Systems Management
13895 Industrial Park Boulevard
Minneapolis, MN 55441

Southfornet Science Library
University of Georgia
Athens, GA 30602

A.C.S. Software Publishing
P. O. Box 5034
Oregon City, OR 97045

Bedding Plants
2043 Hamilton Road
P. O. Box 286
Okemos, MI 48864

Careers Inc.
Educational Researchers and Publishers
1211 10th Street, SW
P. O. Box 135
Largo, FL 34649-0135

Education Design
47 W 13th Street
New York, NY 10011

Encyclopedia Britannica Education Corporation
425 N Michigan Avenue
Chicago, IL 60611

Guidance Associates
Communications Park, Box 3000
Mount Kisco, NY 10549-0900

The Idea Bank
P. O. Box 23994
Tempe, AZ 85282

Landscape Specialists
44280 McKenzie Highway
Leaburg, OR 97489

ORTHO--Chevron Chemical Company
742 Bancroft Way
Berkeley, CA 94710

Safety Rules
3727 Joan Drive
Waterloo, IA 50702

Teaching Aids
P. O. Box 1798
Costa Mesa, CA 92628-7098

Telsco Industries
Box 18205
Dallas, TX 75218

The Training Files
1001 Bridgeway, Suite 304
Sausalito, CA 94965
Attn: Betty Yett or Frances Martin

Thompson Publications
P. O. Box 9335
Fresno, CA 93791

University of California
Division of Agriculture &
Natural Resources
6701 San Pablo Avenue
Oakland, CA 94608-1239

Audiovisual Materials

Audio-Forum
96 Broad Street
Guilford, CT 06437

Audio Visual Production
Department of Horticulture
Purdue University
West Lafayette, IN 47907

Audio-Visual Resource Center
8 Research Park
Cornell University
Ithaca, NY 14850

The AVI Publishing Company
250 Post Road, E
P. O. Box 831
Westport, CT 06881

Close-Up Photo
4 Little River Lane
Hendersonville, NC 28739

Coast Telecourses
10231 Slater Avenue
Fountain Valley, CA 92708

Creative Educational Video
5147-A 69th Street
Lubbock, TX 79424

Educational Filmstrips
1464 19th Street
Huntsville, TX 77340

Landscape Specialists
Videotape Division
28505 Siesta Lane
Eugene, OR 97402

Michigan Media
The University of Michigan
Media Resource Center
400 Fourth Street
Ann Arbor, MI 48103

Modern Talking Picture Service
5000 Park Street, N
St. Petersburg, FL 33709

National Audiovisual Center
Washington, DC 20409

National Information Center for
Educational Media
P. O. Box 40130
Albuquerque, NM 87196

The National Video
Clearinghouse
100 Lafayette Drive
Syosset, NY 11791

Photocom
Box 3135
Pismo Beach, CA 93449

Reinforcement Agri-Media
Media Distribution
University of Minnesota
Box 734 Mayo
Minneapolis, MN 55414

Vernard Films
Box 1332
Peoria, IL 61654

Vocational Media Associates
P. O. Box 1050
Mount Kisco, NY 10549-0050

For more information about instructional resource materials, refer to the Program Guide for Ornamental Horticulture (1986) or contact the Instructional Materials Service, 305 Rolfs Hall, University of Florida, Gainesville, FL 32611, (904) 392-0502, SUNCOM 622-0502.

FEIS Service

If you need (1) information about copyright; (2) a list of instructors teaching in agriculture programs in Florida; (3) journal articles or project reports on specific topics; (4) curriculum and instructional materials; or (5) information on current trends, issues, and research, please contact the Florida Educational Information Service (FEIS), Center for Instructional Development and Services, College of Education, Florida State University, 2003 Apalachee Parkway, Tallahassee, Florida 32301, (904) 487-2054. FEIS will tailor its service to meet your needs on information concerning resource materials.

APPENDIX

Sample Student Learning Guide

SAMPLE

STUDENT LEARNING GUIDE

Program: Landscape Operations

Course: Landscape Operations 2

Intended Outcome: Maintain Landscape and Equipment

SPS 17.02: Identify Weeds and Apply Herbicides Safely

Introduction: Weeds interfere with planting, growing, and harvesting and contribute to the unsightly appearance of a garden, lawn, or plant bed. Therefore, it is important that weeds be identified and removed for efficient landscape maintenance. Good weed control practices can save money, time, and effort.

This student learning guide consists of the following three parts:

Part 1--Weed Identification
Part 2--Mechanical Weed Control
Part 3--Chemical Weed Control

RESOURCES

References

Applying Pesticides Correctly: A Guide for Private and Commercial Applicators. Gainesville: University of Florida, 1972.

Bohmont, Bert L. The New Pesticide User's Guide. Reston, Va.: Reston Publishing Co., 1984.

Fundamentals of Agribusiness and Natural Resources Occupations, Student Guide. Tallahassee: Florida Department of Education, 1984.

Gruttadaurio, Joann. Weed Science: A Teaching Guide. Ithaca, N.Y.: Cornell University, 1976.

Ware, George W. Complete Guide to Pest Control, with and without Chemicals. Fresno, Calif.: Thomson Publications, 1980.

Tools and Equipment

Cultivator
Granular applicator
Herbicide
Hoe
Nozzles
Organic materials for mulching (e.g., straw, bark, sawdust)
Pumps
Sprayer
Tanks
Tractor

NOTE: This page is included only in the teacher's copy.

PART I--WEED IDENTIFICATION. OBJECTIVES

Knowledge Objectives

1. Identify characteristics of life cycles of each weed type: annuals, perennials, and biennials.

2. Select the most appropriate weed-control time according to the growth stage of each weed type.

PART I—WEED IDENTIFICATION.
LEARNING ACTIVITIES

Procedures

1. Read The New Pesticide User's Guide, pp. 76-84, and Weed Science: A Teaching Guide, pp. 10-32, for the life cycles of weeds.

2. Read Complete Guide to Pest Control, with and without Chemicals, pp. 200-202, for weed-control planning according to growth patterns of weeds.

3. Read The New Pesticide User's Guide, pp. 81-83, and Weed Science: A Teaching Guide, pp. 33-39, for identification of weeds.

4. Complete the Self-check for Part I and check your answers with the answer sheet.

5. Complete the Written Test for Part I.

6. Go on to Part II.

PART I--WEED IDENTIFICATION. SELF-CHECK

Directions: The following questions are related to weed identification by growth cycle. Circle the best answer to each of the following questions.

1. Which annual weed germinates in the fall?

   a. winter annual
   b. spring annual
   c. summer annual
   d. fall annual

2. What is a biennial weed?

   a. It blooms every other year.
   b. It lives only half a year.
   c. It lives only two years.
   d. It lives for more than two years.

3. The underground roots and stems of which of the following weeds can remain alive through more than a one-year period?

   a. annuals and perennials
   b. annuals and biennials
   c. biennials and perennials
   d. annuals, biennials, and perennials

4. By which of the following do annual weeds reproduce?

   a. roots
   b. seeds
   c. bulbs
   d. rhizomes

5. To control perennial weeds, at which stage is chemical control most effective?

   a. right after seeding
   b. just prior to flowering
   c. right after flowering
   d. at the vegetative stage

6. What time of the year is best for biennials and perennials to be chemically controlled?

   a. spring
   b. fall
   c. summer
   d. winter

Now check your answers with the correct ones provided on the answer sheet for Self-check, Part I.

PART I—WEED IDENTIFICATION.
SELF-CHECK ANSWER SHEET

1. a
2. c
3. c
4. b
5. b
6. b

If any of your answers is incorrect, review the appropriate part(s) of the instructional materials listed on the Learning Activities sheet.

If you feel confident that you have achieved the objectives on weed identification, tell your instructor that you are ready to take the written test.

Go on to Part II after you have successfully completed the written test for Part I.

PART I—WEED IDENTIFICATION. WRITTEN TEST_____

Student's Name _____

Directions: Circle the best answer(s) to each of the following questions.

1. Which **three** of the following describe the reasons why weeds should be controlled?

   a. They compete with crops for water, light, and nutrients.
   b. They destroy the beauty of landscapes.
   c. They provide a breeding ground for insects.
   d. They can kill beneficial insects.

2. Which one of the following statements describes a characteristic of a perennial weed?

   a. It blooms all the time.
   b. It lives only one year.
   c. It lives only two years.
   d. It lives for more than two years.

3. At which growth stage are annuals best controlled?

   a. seedling
   b. vegetative
   c. flowering
   d. maturity

NOTE: **This written test is included <u>only</u> in the teacher's copy.**

PART I—WEED IDENTIFICATION.
WRITTEN TEST ANSWER SHEET_____

1. a, b, c
2. d
3. b

NOTE: This answer key is included only in the teacher's copy.

PART II—MECHANICAL WEED CONTROL. OBJECTIVES

Knowledge Objective

Describe the following mechanical weed-control methods: hoeing, mulching, cultivating, and tillage.

Performance Objective

Given necessary tools, equipment, and materials, control weeds by hoeing, mulching, and cultivating. Your performance on all tasks listed below should be evaluated as satisfactory.

Tasks

1. HOEING

   Given a hoe,

   a. identify weeds to be removed
   b. remove weeds by cutting them out with a hoe without damaging the surrounding plants or the crops
   c. place the weeds in a suitable container
   d. dispose of the collected weeds
   e. clean and store the hoe.

2. MULCHING

   Given organic materials,

   a. identify the field area to be mulched
   b. spread a three- to six-inch layer of one of the organic materials on the soil surface around the plants
   c. clean the area after mulching.

3. CULTIVATING

   Given a tractor with a three-point hitch and an adjustable field cultivator,

   a. identify the field area to be cultivated
   b. connect the cultivator to the tractor and perform a preservice check on the unit prior to use
   c. set the cultivator sweep distances and make necessary adjustments on the cultivator
   d. drive the tractor down the rows, removing as many of the weeds as possible without damaging the crops
   e. clean and store the cultivator and the tractor.

PART II—MECHANICAL WEED CONTROL. LEARNING ACTIVITIES

Procedures

1. Read Weed Science: A Teaching Guide, pp. 72-78; Applying Pesticides Correctly: A Guide for Private and Commercial Applicators, p. 18; and The New Pesticide User's Guide, p. 84; for mechanical weed-control methods.

2. Read Complete Guide to Pest Control, with and without Chemicals, pp. 202-203, for the mulching method.

3. Study the Information Sheet for Part II.

4. Complete the Self-check for Part II and check your answers with the Answer Sheet.

5. Complete the Activity Sheet for Part II and check your work with your instructor, if necessary.

6. Complete the Written Test for Part II.

7. Complete the Performance Test for Part II.

8. Go on to Part III.

PART II—MECHANICAL WEED CONTROL. INFORMATION SHEET

Some examples of mechanical weed-control methods are hoeing, mulching, and cultivating. The following steps are basic procedures of mechanical weed control for a field area or the flowering plants.

1. HOEING

   a. Obtain a hoe and supplies.
   b. Identify weeds to be removed.
   c. Remove weeds by cutting them out with a hoe without damaging the surrounding plants or the crops.
   d. Place the weeds in a suitable container.
   e. Dispose of the collected weeds.
   f. Clean and store the hoe.

2. MULCHING

   a. Obtain organic materials, such as leaves, grass clippings, sawdust, bark chips, straw, and compost.
   b. Identify the field area to be mulched.
   c. Spread a three- to six-inch layer of one of the organic materials on the soil surface around the plants.

      CAUTION: It is important to keep the layer deep enough to do the job. If it is necessary, add more mulching material over the old layers for all benefits of mulching.

   d. Clean the area after mulching.

3. CULTIVATING

   a. Obtain a tractor with a three-point hitch and an adjustable field cultivator.
   b. Identify the field area to be cultivated.
   c. Connect the cultivator to the tractor and perform a preservice check on the unit prior to use.
   d. Set the cultivator sweep distances and make necessary adjustments on the cultivator.
   e. Drive the tractor down the rows, removing as many of the weeds as possible without damaging the crops.
   f. Clean and store the cultivator and the tractor.

Complete the Self-check for Part II, beginning on the next page.

PART II--MECHANICAL WEED CONTROL. SELF-CHECK_____

Directions: The following questions are related to mechanical weed control. Circle the best answer to each of the following questions.

1. What is the purpose of cultivation?

   a. to destroy and injure the weed's root system
   b. to provide a barrier from light
   c. to reduce soil washing
   d. to keep the weeds dry

2. Which of the following describes biological weed control?

   a. use of chemicals
   b. use of heat
   c. use of insects
   d. use of mulches

3. Which of the following is **not** a purpose of good mulching?

   a. to reduce soil blowing
   b. to keep the soil dry
   c. to prevent weed germination
   d. to reduce soil washing

4. Which of the following materials would **not** be used for mulching?

   a. clear plastic
   b. sawdust
   c. bark chips
   d. lawn clippings

5. Tillage is most effective for which of the following?

   a. annual plants
   b. perennial plants
   c. tall growing plants
   d. seedlings

6. Which of the following is **not** a mechanical weed-control method?

   a. cultivating
   b. plowing
   c. hand pulling
   d. freezing

Now check your answers with the correct ones provided on the answer sheet for Self-check, Part II.

PART II--MECHANICAL WEED CONTROL.
SELF-CHECK ANSWER SHEET

1. a
2. c
3. b*
4. a**
5. c
6. d

* Winter mulches are used to keep soils warm but not dry.

** Although clear plastic is not used for mulching, black plastic is an inorganic mulch used in vegetable, fruit, and ornamental production. It is used in sheet or roll form.

If any of your answers is incorrect, review the appropriate part(s) of the instructional materials listed on the Learning Activities sheet.

If you feel confident that you have achieved the objectives on weed control by mechanical methods, tell your instructor that you are ready for the next activity.

PART II—MECHANICAL WEED CONTROL.
ACTIVITY SHEET_____

Directions: Tell your instructor that you are ready to control weeds using mechanical tools. Your instructor and you should make arrangements for this activity. Then control weeds using a hoe, by mulching, and by cultivation. Evaluate your work using the following checklist.

Task	Yes	No
1. HOEING		
a. Gathered a hoe and supplies?		
b. Identified weeds to be removed?		
c. Removed weeds by cutting them out with a hoe without damaging the surrounding plants or crops?		
d. Placed the weeds in a suitable container?		
e. Disposed of the collected weeds?		
f. Cleaned and stored the hoe?		
2. MULCHING		
a. Gathered organic materials, such as leaves, grass clippings, sawdust, bark chips, straw, and compost?		
b. Identified the field area to be mulched?		
c. Spread a three- to six-inch layer of one of the organic materials on the soil surface around the plants?		
d. Cleaned the area after mulching?		

(Continued on the next page.)

ACTIVITY SHEET for Mechanical Weed Control (continued)

Task	Yes	No
3. CULTIVATING		
a. Obtained a tractor and an appropriate cultivator?		
b. Identified the field area to be cultivated?		
c. Connected the cultivator to the tractor?		
d. Performed a preservice check on the equipment prior to use?		
e. Set the cultivator sweep distances and made necessary adjustments on the cultivator?		
f. Drove the tractor down the rows, removing as many of the the weeds as possible without damaging the crops or plants?		
g. Cleaned and stored the cultivator and the tractor?		

All tasks above should be rated "Yes." If so, and if you feel confident that you have achieved knowledge and skills on mechanical weed control, tell your instructor that you are ready to take the written test.

If any of the tasks was rated "No," check with your instructor. Your instructor may give you more instruction or show a demonstration on weed control by mechanical methods.

Go on to Part III after successful completion of the Written Test, Part II, and the Performance Test, Part II.

PART II--MECHANICAL WEED CONTROL.
WRITTEN TEST_____

Student's Name _____

Directions: Circle the best answer to each of the following questions.

1. Which of the following is a purpose of crop rotation?

   a. changes the organic matter of the soil
   b. reduces the buildup of certain weeds
   c. changes soil moisture
   d. kills the biennial plants

2. Which of the following describes mulching control of weeds?

   a. acts as a barrier over the soil
   b. cuts off air to the soil
   c. prevents water flow to plant roots
   d. lowers pH in the soil

3. Which of the following methods is an example of mechanical weed control?

   a. spraying with a weed killer
   b. removing weeds with a hoe
   c. use of selective herbicides
   d. use of beneficial insects

4. Which of the following is **not** a tool used for cultivation?

   a. rototiller
   b. hoe
   c. power rake
   d. hand cultivator

NOTE: This written test is included only in the teacher's copy.

PART II—MECHANICAL WEED CONTROL.
WRITTEN TEST ANSWER SHEET_____

1. b
2. a
3. b
4. c

NOTE: This answer key is included only in the teacher's copy.

PART II—MECHANICAL WEED CONTROL.
PERFORMANCE TEST_____

Directions: Tell the student to control the weeds by hoeing, mulching, and cultivating methods. Provide necessary materials, equipment, and tools. Then evaluate the student's performance, using this checklist.

Student's Name: _____

Evaluator: _____ Date: _____

Task	Evaluator's Ratings: Satisfactory	Evaluator's Ratings: Not Satisfactory
1. HOEING		
a. Gathered a hoe and supplies?		
b. Identified weeds to be removed?		
c. Removed the weeds by cutting them out with a hoe without damaging the surrounding plants or the crops?		
d. Placed the weeds in a suitable container?		
e. Disposed of the collected weeds?		
f. Cleaned and stored the hoe?		
2. MULCHING		
a. Gathered organic materials, such as leaves, grass clippings, sawdust, bark chips, straw, and compost?		
b. Identified the field area to be mulched?		
c. Spread a three- to six-inch layer of one of the organic materials on the soil surface around plants?		
d. Cleaned the area after mulching?		

(Continued on the next page.)

PERFORMANCE TEST for Mechanical Weed Control (continued)

Task	Evaluator's Ratings: Satisfactory	Not Satisfactory
3. CULTIVATING		
a. Obtained a tractor and an appropriate cultivator?		
b. Identified the field area to be cultivated?		
c. Connected the cultivator to the tractor and performed a preservice check on the equipment prior to use?		
d. Set the cultivator sweep distances and made necessary adjustments on the cultivator?		
e. Drove the tractor down the rows, removing as many of the weeds as possible without damaging the crops or the plants?		
f. Cleaned and stored the cultivator and the tractor?		
Comments:		

Go on to Part III after successful completion of this performance test.

PART III--CHEMICAL WEED CONTROL. OBJECTIVES

Knowledge Objectives

1. Identify application methods of chemical treatments regarding coverage area and selectiveness.
2. Identify factors determining effectiveness of herbicide.
3. Identify safety precautions for chemical application.
4. Identify function of each type of herbicide application and the advantages and disadvantages of each.

Performance Objective

Given a field area of flowering plants to be weeded, chemicals, and suitable tools and equipment, control weeds by applying herbicide. Your performance on all tasks listed below should be evaluated as satisfactory.

Tasks

1. Check the current weed condition.
2. Thoroughly review the information on the herbicide label.
3. Formulate and mix herbicide with a carrier.
4. Select the herbicide-application equipment.
5. Calibrate the amount of spray to be delivered per acre.
6. Operate the equipment, following safety precautions.
7. Clean and store tools and equipment.

PART III—CHEMICAL WEED CONTROL. LEARNING ACTIVITIES

Procedures

1. Read Fundamentals of Agribusiness and Natural Resources Occupations: Student Guide, p. 274 and TM 84, and Weed Science: A Teaching Guide, p. 83 and pp. 96-97, for the application methods of chemical treatments.

2. Read The New Pesticide User's Guide, pp. 84-87, and Weed Science: A Teaching Guide, pp. 84-85, for herbicide classification by applied area and selectiveness.

3. Read Weed Science: A Teaching Guide, p. 86, and Fundamentals of Agribusiness and Natural Resources Occupations: Student Guide, p. 274 and TM 83, for herbicide classification by time.

4. Read Fundamentals of Agribusiness and Natural Resources Occupations: Student Guide, p. 275, for factors determining herbicide application rate.

5. Read Fundamentals of Agribusiness and Natural Resources Occupations: Student Guide, p. 277, for safety precautions.

6. Read Weed Science: A Teaching Guide, pp. 118-120, and Fundamentals of Agribusiness and Natural Resources Occupations: Student Guide, p. 278, for herbicide formulation.

7. Read The New Pesticide User's Guide, pp. 257-276, for herbicide equipment calibration.

8. Study the Information Sheet for Part III and read Weed Science: A Teaching Guide, pp. 120-122, for the general procedures of herbicide application for weed control.

9. Complete the Self-check for Part III and check your answers with the Answer Sheet.

10. Complete the Activity Sheet for Part III and check your work with your instructor, if necessary.

11. Complete the Written Test for Part III.

12. Complete the Performance Test for Part III.

PART III—CHEMICAL WEED CONTROL. INFORMATION SHEET_____

There are various kinds of chemical application for weed control, depending on which type of machine and equipment is involved. Some examples of such equipment are boom sprayers, band applicators, air blast sprayers, fumigation applicators, granular applicators, and aircraft calibration. (You can find more details in the references suggested for this module.) Different machines and equipment can be applied, depending on the scope and type of crops.

Provided on this sheet are the general procedures for chemical weed control (when a field area or flowering plants are to be weeded) and the suitable tools and equipment.

1. Gather all necessary tools and equipment.

2. Check the current weed condition.

3. Thoroughly review the information on the herbicide label.

4. Formulate and mix the herbicide with a carrier.

5. Select the herbicide-application equipment, considering

   a. types and sizes of sprayers
   b. types and sizes of pumps
   c. types and sizes of tanks
   d. size and height of nozzles
   e. types of granular equipment

6. Calibrate the amount of spray to be delivered per acre.

   NOTE: The careful calibration assures that the herbicide will be applied evenly, at the proper rate, and in the recommended amount of water over the entire field.

7. Operate the equipment, following safety precautions.

8. Clean and store tools and equipment.

Complete the Self-check for Part III, beginning on the next page.

PART III—CHEMICAL WEED CONTROL. SELF-CHECK_____

Directions: The following questions are related to chemical weed control. Circle the best answer to each of the following questions.

1. A selective herbicide kills

   a. nearly all plants.
   b. only perennial plants.
   c. some plants but not others.
   d. only weeds.

2. Which of the following treatments is the most appropriate for limited areas infested with weeds?

   a. spot treatment
   b. directed sprays
   c. band application
   d. broadcast application

3. Which of the following describes a band application of herbicide?

   a. More herbicide is needed than others.
   b. It is more expensive than broadcast application.
   c. It reduces cost because less herbicide is needed.
   d. It is applied to a particular part of a plant.

4. Which one of the following factors **least** influences the amount of herbicide entering a plant through the root?

   a. placement
   b. persistency
   c. solubility
   d. soil humidity

5. When should you apply postemergent herbicide?

   a. before the crop or weeds emerge
   b. after the crop or weeds emerge
   c. before the crop emerges
   d. after the crop emerges

(Continued on the next page.)

6. Which of the following precautions should you observe when applying preplant herbicide?

   a. Most of these herbicides need to be watered or raked into the soil.
   b. The chemical will not control perennial weeds, which already have root systems in the ground.
   c. Very young stock will sometimes be damaged by these herbicides.
   d. Most herbicides should be applied when there is no chance of rain for at least twelve hours.

Now check your answers with the correct ones provided on the answer sheet for Self-check, Part III.

PART III—CHEMICAL WEED CONTROL.
SELF-CHECK ANSWER SHEET

1. c
2. a
3. c*
4. d
5. b
6. d

* A band application of herbicide may not provide sufficient control because of the limited coverage to a given area.

If any of your answers is incorrect, review the appropriate part(s) of the instructional materials listed on the Learning Activities sheet.

If you feel confident that you have achieved the objectives on chemical weed control, tell your instructor that you are ready for the next activity.

PART III--CHEMICAL WEED CONTROL. ACTIVITY SHEET_____

Directions: Tell your instructor that you are ready to control weeds, using herbicides. Your instructor and you should make arrangements for this activity. Then chemically control weeds and evaluate your work using the following checklist.

Task	Yes	No
1. Gathered all necessary tools and equipment?		
2. Checked the current weed condition?		
3. Thoroughly reviewed the information on the herbicide label?		
4. Formulated and mixed the herbicide with a carrier?		
5. Selected the herbicide-application equipment, considering types and sizes of sprayers, pumps, and tanks; size and height of nozzles; and types of granular equipment?		
6. Calibrated the amount of spray to be delivered per acre?		
7. Operated the equipment, following safety precautions?		
8. Cleaned and stored tools and equipment?		

All tasks should be rated "Yes." If they are, and if you feel confident that you have achieved knowledge and skills about controlling weeds using chemicals, tell your instructor that you are ready to take the written test.

If any of the tasks above was rated "No," and if you don't feel confident about this topic, check with your instructor.

Go on to the next learning guide after successful completion of the Written Test, Part III, and the Performance Test, Part III.

PART III—CHEMICAL WEED CONTOL. WRITTEN TEST_____

Student's Name _____

Directions: Circle the best answer to each of the following questions.

1. Which of the following chemicals should you apply after planting and before weeds appear?

   a. postemergent herbicide
   b. preemergent herbicide
   c. germicide
   d. preplant

2. Which of the following determines **least** when to apply herbicides?

   a. time of the day
   b. state of plant growth
   c. condition of plant
   d. soil measure

3. Which of the following describes the use of nonselective herbicide?

   a. It keeps seeds from sprouting.
   b. It kills plants that already have roots.
   c. It kills woody plants.
   d. It is used to edge sidewalks and driveways.

4. Which of the following should you apply to cover the entire area or field at a uniform rate?

   a. spot treatment
   b. band application
   c. broadcast application
   d. directed sprays

5. How does a foliar-applied herbicide **primarily** enter a plant?

   a. roots
   b. flowers
   c. stems
   d. leaves

6. Which of the following describes preplant herbicide application?

   a. It prevents injury to the crop.
   b. It is applied before weeds are grown.
   c. It eliminates annual weeds.
   d. It damages the roots of the crop.

(Continued on the next page.)

WRITTEN TEST for Chemical Weed Control (continued)

7. Which of the following is the **best** way to control dormant perennial weeds in nursery rows?

   a. use of preemergent herbicides
   b. sterilization of soil
   c. cultivation and postemergent herbicide after weeds continue growth
   d. use of geese to eat the weeds after they continue growth

8. If the use you are planning is not listed on the herbicide label, what should you do?

   a. Calculate your intended use from the rate listed on the label.
   b. Estimate the approximate rate you can use and measure the herbicide accordingly.
   c. Mix the herbicide with another that is labelled for your intended use.
   d. Use another herbicide that is labelled for your intended use.

NOTE: This written test is included <u>only</u> in the teacher's copy.

PART III—CHEMICAL WEED CONTROL.
WRITTEN TEST ANSWER SHEET_____

1. b
2. a
3. d*
4. c
5. c
6. a
7. c
8. d

* A selective herbicide kills some plants but not others; a nonselective herbicide kills nearly all plants.

NOTE: This answer key is included only in the teacher's copy.

PART III—CHEMICAL WEED CONTROL.
PERFORMANCE TEST _____

Directions: Tell the student to control the weeds by applying herbicides. Provide necessary equipment, tools, and chemicals. Then evaluate the student's performance using this checklist.

Student's Name: _____

Evaluator: _____ Date: _____

Task	Evaluator's Ratings: Satisfactory	Not Satisfactory
1. Gathered all necessary tools and equipment?		
2. Checked the current weed condition?		
3. Thoroughly reviewed the information on the herbicide label?		
4. Formulated and mixed the herbicide with a carrier?		
5. Selected the herbicide-application equipment, considering types and sizes of sprayers, pumps, and tanks; size and height of nozzles; and types of granular equipment?		
6. Calibrated the amount of spray to be delivered per acre?		
7. Operated the equipment, following safety precautions?		
8. Cleaned and stored tools and equipment?		

Comments: _____

_____

_____

END OF SAMPLE

State of Florida
Department of Education
Tallahassee, Florida
Betty Castor, Commissioner
Affirmative action/equal opportunity employer

Division of Vocational, Adult, and Community Education

DVACE/07/89/350 123456789/89 AG 401 BK 89

CAREER MERIT ACHIEVEMENT PLAN (CAREER MAP)

LANDSCAPE TECHNOLOGY

(0101.060501)

STUDENT'S NAME

State of Florida

An affirmative action/equal opportunity employer

DEPARTMENT OF EDUCATION
Betty Castor, Commissioner

DIVISION OF VOCATIONAL, ADULT, AND COMMUNITY EDUCATION
Robert S. Howell, Director

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THIS MERIT ACHIEVEMENT PLAN RECORDS THE ACHIEVEMENTS OF:

Student's Name _____

Student's ID Number _____

Student's Address _____

_____

Instructor's Name _____ **Initials** _____

School _____

_____

Date Started _____

PRIMARY JOB TITLES FOR THIS INSTRUCTIONAL PROGRAM

- Landscape Designer (DOT #406.134-014)
- Landscape Contractor (DOT #182.167-014)
- Special-Effect Gardener (DOT #406.381-010)

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OVERVIEW

This Career MAP includes the competencies required for entry into the field of landscape technology. Business and industry representatives have recommended that students in this field master these competencies in order to become employable. Local education agencies (LEAs) may adapt these competencies to meet their work-force needs.

Purposes of the MAP

The purposes of the MAP are to display the student performance standards (SPSs) required by the LEA and to document the level of achievement on SPSs that the student demonstrates.

How to Use the MAP

Administrator and Instructor. The administrator and instructor can use Career MAPs in curriculum planning, program updating and improvement, and teacher recruitment, selection, and updating. If the LEA changes or adds SPSs, the revised or additional SPSs should be included in the blank boxes that appear within each intended outcome or at the end of this MAP.

Instructor. The instructor can use Career MAPs to keep track of student progress on SPSs. By periodically reviewing the ratings on standards, the instructor can identify a student's strengths and weaknesses and on that basis identify the skills for which the student needs remedial instruction or advanced training. MAPs can also be useful in student counseling and evaluation.

Co-op Instructor/Employer. The employer who sponsors a co-op program should use the Career MAP for keeping a record of the student's performance on appropriate standards. The MAPs will also help the co-op instructor/employer in counseling and evaluating the student.

Student. The student may use the MAP to show potential employers the performance standards he or she has mastered. In order to present a complete record, the student should encourage the instructor/co-op employer to rate his or her level of achievement on all the appropriate SPSs and to fill in the verification form and the cooperative work experience page in the back of this MAP.

Employer. The MAP shows an employer the SPSs mastered by the student (a prospective employee) and the proficiency level achieved on each one. This information can help the employer make decisions about hiring, job assignments, and job-training needs.

Rating Student Performance

Performance Competencies. Ratings on SPSs should be based upon business/industrial performance standards. The evaluator observes and evaluates student performance as he or she would in the role of the employer or supervisor.

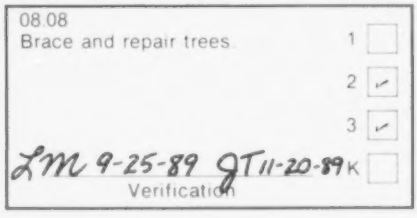
For each skill listed, the learner receives a rating of 1, 2, or 3. Each rating indicates a particular level of achievement:

1 = Learner demonstrates knowledge and understanding of this SPS, but is not yet able to apply that knowledge or understanding.

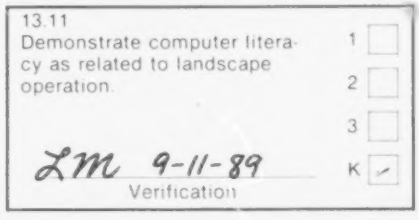
2 = Learner performs this SPS satisfactorily with only periodic supervision.

3 = Learner performs this SPS satisfactorily without supervision.

Whenever a performance standard is demonstrated, the instructor checks the appropriate rating box (1, 2, or 3) and initials and dates the verification line. If the student later demonstrates a higher level of achievement on a performance competency, the instructor checks the higher level and then enters his or her initials and the new date on the verification line, as shown in the following example:



Knowledge Competencies. For each SPS that is a knowledge competency only, with no manipulative skill involved, only one level of achievement is possible. If the student masters the competency, he or she receives a check in the bottom box ("K"), as shown below:



NOTE: An SPS without a checked rating indicates that the learner has not mastered the standard from lack of ability, time, opportunity, or need (the student's area of specialization may not have required it).

01.0 ANALYZE AND DESIGN THE PROJECT.

01.01 Determine the purpose, problems, or desired effect of the project. 1 2 3 K Verification	01.02 Analyze the environmental conditions of the landscape or interiorscape. 1 2 3 K Verification	01.03 Determine site-analysis problems. 1 2 3 K Verification
01.04 Demonstrate a working knowledge of a computer-assisted drafting (CAD) system. 1 2 3 K Verification	01.05 Design a hardscape plan. 1 2 3 K Verification	01.06 Design and select appropriate plant materials for the desired effect and function. 1 2 3 K Verification
01.07 Determine the method and form of presentation of the project. 1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification
1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification

02.0 PREPARE ESTIMATE AND ESTABLISH CONTRACTS.

02.01 Develop a list of materials required for the project. 1 2 3 K Verification	02.02 Determine equipment needs. 1 2 3 K Verification	02.03 Estimate time and work hours. 1 2 3 K Verification
02.04 Determine costs of materials, equipment, and labor. 1 2 3 K Verification	02.05 Prepare for the customer a price based on specifications. 1 2 3 K Verification	02.06 Establish the terms of a contract. 1 2 3 K Verification

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

03.0 ANALYZE AND ORGANIZE THE PROJECT.

03.01 Interpret plans and specifications. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	03.02 Identify safety requirements. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	03.03 Organize site preparation. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
03.04 Locate project materials. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	03.05 Determine personnel needs. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	03.06 Determine equipment needs. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
03.07 Establish a project schedule. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

04.0 LAY OUT AND INSTALL LANDSCAPE AND INTERIORSCAPE.

04.01 Locate existing utilities. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.02 Rough grade the site. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.03 Install large materials. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification

04.04 Install an irrigation system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.05 Construct hardscape (walls, walks, patio, drives, etc.). 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.06 Lay out and install plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
04.07 Prepare the interiorscape. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.08 Prepare the final grade. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.09 Install lawns. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
04.10 Install mulch. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	04.11 Perform final cleanup. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

05.0 PLAN, INSTALL, AND SERVICE AN IRRIGATION SYSTEM.

05.01 Determine irrigation requirements. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.02 Assess the quality of irrigation water. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.03 Plan an irrigation system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
05.04 Supervise the installation of irrigation equipment. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.05 Service and maintain electric and engine-driven pumps. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.06 Operate and service a low-volume irrigation system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
05.07 Operate and service an overhead irrigation system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.08 Operate and maintain an automatic system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.09 Calculate the cost-efficiency of an irrigation system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification

LANDSCAPE TECHNOLOGY

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

06.0 PLAN AND INSTALL A DRAINAGE SYSTEM.

06.01 Determine the natural slope/ grade of an area. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.02 Determine the texture and percolation characteristics of the soil. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.03 Identify techniques for constructing ditches and culverts. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
06.04 Direct the movement of water away from structures and installations. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.05 Plan the construction of an underground drainage system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.06 Estimate and order appropriate fill materials. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
06.07 Establish proper elevations and grade a landscape site. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.08 Read soils and contour maps. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

07.0 MAINTAIN CUSTOMER RELATIONS AND OBSERVE FOLLOW-UP PROCEDURES.

07.01 Conduct walk-through of project with client to assure satisfaction. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.02 Identify current and future maintenance requirements. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.03 Analyze project records for profitability and employee performance. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

08.0 MAINTAIN LANDSCAPE PLANTS.

08.01 Determine water requirements and apply water at proper rates. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.02 Identify weeds and apply herbicides safely. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.03 Determine fertilization requirements and apply fertilizer at proper rates. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
08.04 Identify plant pest problems and apply corrective measures. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.05 Regulate the growth of landscape plants through chemical and mechanical means. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.06 Maintain turf viability (mow at proper height and frequency; aerate, edge, and clip turf; and remove trash). 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
08.07 Cultivate and mulch plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.08 Brace and repair trees. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

09.0 MANAGE A PEST-CONTROL PROGRAM.

09.01 Develop an integrated pest management program or schedule. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	09.02 Train workers in the safe use of pesticides. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	09.03 Obtain a restricted-use pesticide license. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

10.0 PROTECT PLANTS AND EQUIPMENT FROM ADVERSE WEATHER.

10.01 Monitor and interpret weather forecasts. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	10.02 Supervise procedures for protecting plants and equipment from adverse weather. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	10.03 Compare cost and efficiency of various methods of protecting plants and equipment from adverse weather. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

11.0 SELECT, OPERATE, AND MAINTAIN LANDSCAPE TOOLS AND EQUIPMENT.

11.01 Determine equipment needs for the company. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	11.02 Select and operate equipment for the job. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	11.03 Supervise the service and maintenance of power equipment. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
11.04 Supervise the repair and maintenance of facilities. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	11.05 Instruct and supervise employees in the safe use of tools and equipment. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	11.06 Maintain an inventory of parts and supplies. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

12.0 MAINTAIN AND ANALYZE RECORDS.

12.01 Maintain fertilizer- and pesticide-application records. 1 2 3 K
Verification

12.02 Keep equipment-maintenance and service records. 1 2 3 K
Verification

12.03 Maintain sales and production records. 1 2 3 K
Verification

12.04 Record labor and personnel information. 1 2 3 K
Verification

12.05 Keep inventory records. 1 2 3 K
Verification

12.06 Analyze the cost and effectiveness of management practices. 1 2 3 K
Verification

12.07 Determine insurance needs. 1 2 3 K
Verification

12.08 Prepare an annual budget. 1 2 3 K
Verification

12.09 Prepare a five-year projection plan. 1 2 3 K
Verification

12.10 Maintain accounts-receivable and accounts-payable records. 1 2 3 K
Verification

12.11 Describe the use of computers in landscape operation. 1 2 3 K
Verification

1 2 3 K
Verification

1 2 3 K
Verification

1 2 3 K
Verification

1 2 3 K
Verification

13.0 DEMONSTRATE MANAGERIAL AND SUPERVISORY SKILLS.

13.01 Instruct employees in their tasks. 1 2 3 K
Verification

13.02 Prepare daily work plans. 1 2 3 K
Verification

13.03 Enforce safety regulations. 1 2 3 K
Verification

13.04 Evaluate the performance of employees. 1 2 3 K Verification	13.05 Develop an outline for a policy manual. 1 2 3 K Verification	13.06 Organize and conduct employee training. 1 2 3 K Verification
13.07 Conduct employee-grievance procedures. 1 2 3 K Verification	13.08 Prepare job descriptions. 1 2 3 K Verification	13.09 Conduct job interviews. 1 2 3 K Verification
13.10 Demonstrate effective communication skills. 1 2 3 K Verification	13.11 Demonstrate computer literacy as related to landscape operation. 1 2 3 K Verification	1 2 3 K Verification
1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification

14.0 DEMONSTRATE EMPLOYABILITY SKILLS.

14.01 Conduct a job search. 1 2 3 K Verification	14.02 Secure information about a job. 1 2 3 K Verification	14.03 Identify documents that may be required when applying for a job. 1 2 3 K Verification
14.04 Complete a job-application form correctly. 1 2 3 K Verification	14.05 Demonstrate competence in job-interview techniques. 1 2 3 K Verification	14.06 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other persons. 1 2 3 K Verification
14.07 Identify acceptable work habits. 1 2 3 K Verification	14.08 Demonstrate knowledge of how to make job changes appropriately. 1 2 3 K Verification	14.09 Demonstrate acceptable employee health habits. 1 2 3 K Verification

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

LANDSCAPE TECHNOLOGY

COOPERATIVE WORK EXPERIENCE COMPETENCIES.

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

LANDSCAPE TECHNOLOGY

VERIFICATION

Each instructor who rates this student on competencies in this MAP should fill in one of the boxes below.

Initials _____ Signature _____

Title _____

School Name _____

School Address _____

Initials _____ Signature _____

Title _____

School Name _____

School Address _____

Initials _____ Signature _____

Title _____

School Name _____

School Address _____

COOPERATIVE WORK EXPERIENCE

In addition to classroom training and laboratory performance identified on the Career MAP, this student has participated in cooperative work experience with employers, as shown below.

Dates _____ Employer _____

Employer's Address _____

Supervisor _____

Supervisor's Title _____

Dates _____ Employer _____

Employer's Address _____

Supervisor _____

Supervisor's Title _____

Dates _____ Employer _____

Employer's Address _____

Supervisor _____

Supervisor's Title _____

NOTES

This section of the MAP is provided for the instructor, employer, or student to list additional qualifying statements or other pertinent information. All comments should be initialed for verification.

This public document was promulgated at an annual cost of $000.00, or $00.00 per copy, to display the intended outcomes and student performance standards of a vocational program and to provide a document for teachers to record student levels of achievement.

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DECA Individual and Chapter Events

PRODUCED BY

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Florida State University

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THIS MERIT ACHIEVEMENT PLAN RECORDS THE ACHIEVEMENTS OF:

Student's Name _____

Student's ID Number _____

Student's Address _____

_____

Instructor's Name _____ **Initials** _____

School _____

_____

Date Started _____

PRIMARY JOB TITLES FOR THIS INSTRUCTIONAL PROGRAM

- Landscaper (DOT #408.161-010)
- Landscape Installer
- Landscape Maintainer
- Landscape Gardener (DOT #408.161-010)

RELATED JOB TITLES

- Gardener (DOT #80001400)
- Park Worker (DOT #406.134-014)

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Jack Siebenthaler, Horticultural Consultant, Clearwater

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OVERVIEW

This Career MAP includes the competencies required for entry into the field of landscape operations. Business and industry representatives have recommended that students in this field master these competencies in order to become employable. Local education agencies (LEAs) may adapt these competencies to meet their work-force needs.

Purposes of the MAP

The purposes of the MAP are to display the student performance standards (SPSs) required by the LEA and to document the level of achievement on SPSs that the student demonstrates.

How to Use the MAP

Administrator and Instructor. The administrator and instructor can use Career MAPs in curriculum planning, program updating and improvement, and teacher recruitment, selection, and updating. If the LEA changes or adds SPSs, the revised or additional SPSs should be included in the blank boxes that appear within each intended outcome or at the end of this MAP.

Instructor. The instructor can use Career MAPs to keep track of student progress on SPSs. By periodically reviewing the ratings on standards, the instructor can identify a student's strengths and weaknesses and on that basis identify the skills for which the student needs remedial instruction or advanced training. MAPs can also be useful in student counseling and evaluation.

Co-op Instructor/Employer. The employer who sponsors a co-op program should use the Career MAP for keeping a record of the student's performance on appropriate standards. The MAPs will also help the co-op instructor/employer in counseling and evaluating the student.

Student. The student may use the MAP to show potential employers the performance standards he or she has mastered. In order to present a complete record, the student should encourage the instructor/co-op employer to rate his or her level of achievement on all the appropriate SPSs and to fill in the verification form and the cooperative work experience page in the back of this MAP.

Employer. The MAP shows an employer the SPSs mastered by the student (a prospective employee) and the proficiency level achieved on each one. This information can help the employer make decisions about hiring, job assignments, and job-training needs.

Rating Student Performance

Performance Competencies. Ratings on SPSs should be based upon business/industrial performance standards. The evaluator observes and evaluates student performance as he or she would in the role of the employer or supervisor.

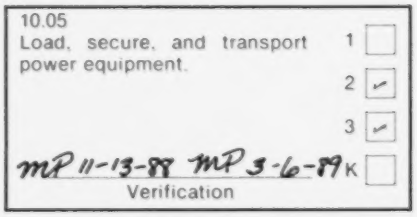
For each skill listed, the learner receives a rating of 1, 2, or 3. Each rating indicates a particular level of achievement:

1 = Learner demonstrates knowledge and understanding of this SPS but is not yet able to apply that knowledge or understanding.

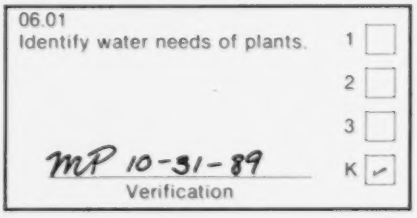
2 = Learner performs this SPS satisfactorily with only periodic supervision.

3 = Learner performs this SPS satisfactorily without supervision.

Whenever a performance standard is demonstrated, the instructor checks the appropriate rating box (1, 2, or 3) and initials and dates the verification line. If the student later demonstrates a higher level of achievement on a performance competency, the instructor checks the higher level and then enters his or her initials and the new date on the verification line, as shown in the following example:



Knowledge Competencies. For each SPS that is a knowledge competency only, with no manipulative skill involved, only one level of achievement is possible. If the student masters the competency, he or she receives a check in the bottom box ("K"), as shown below:



NOTE: An SPS without a checked rating indicates that the learner has not mastered the standard from lack of ability, time, opportunity, or need (the student's area of specialization may not have required it).

01.0 DEMONSTRATE AN UNDERSTANDING OF THE HORTICULTURE INDUSTRY.

01.01 Identify fields of endeavor. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	01.02 Describe the economic importance of the horticulture industry. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	01.03 Describe the environmental importance of the horticulture industry. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
01.04 Identify employment opportunities. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	01.05 Describe regulatory aspects. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	01.06 Identify continuing educational opportunities. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
01.07 Identify professional organizations and trade journals in the horticulture industry. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

02.0 DESCRIBE PLANT PHYSIOLOGY AND GROWTH.

02.01 Describe woody and herbaceous plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	02.02 Identify the parts of the plant. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	02.03 Describe the process of photosynthesis. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
02.04 Describe the basic functions of roots, stems, and leaves. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	02.05 List the requirements for healthy plant growth. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	02.06 Identify taproot and fibrous root systems. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification

02.07 Identify the difference between evergreen and deciduous plants. 1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification
1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification

03.0 IDENTIFY AND CLASSIFY PLANTS.

03.01 Classify plants as monocots or dicots. 1 2 3 K Verification	03.02 Identify plants according to their scientific and common names. 1 2 3 K Verification	03.03 Classify plants as annuals, biennials, and perennials. 1 2 3 K Verification
03.04 Identify the plants appropriate to a region. 1 2 3 K Verification	03.05 List the environmental preferences of plants (shade, sun, wind, moisture, salt, etc.). 1 2 3 K Verification	03.06 Classify plants according to growth habit. 1 2 3 K Verification
1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification

04.0 PROPAGATE PLANTS.

04.01 Identify asexual and sexual plant propagation methods. 1 2 3 K Verification	04.02 Prepare propagation media. 1 2 3 K Verification	04.03 Select and collect propagation materials. 1 2 3 K Verification

04.04 Demonstrate propagation by seeding, grafting, budding, layering, separation, division, and cuttings. 1 2 3 K Verification	04.05 Demonstrate environmental controls for propagation materials (moisture, temperature, light). 1 2 3 K Verification	04.06 Transplant rooted propagation materials. 1 2 3 K Verification
04.07 Identify propagating and growing facilities and structures. 1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification
1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification

05.0 IDENTIFY GROWING MEDIA AND APPLY FERTILIZERS.

05.01 Identify soil and media materials. 1 2 3 K Verification	05.02 Identify the types and kinds of fertilizer. 1 2 3 K Verification	05.03 Identify methods of distributing fertilizers. 1 2 3 K Verification
05.04 Interpret the analysis of fertilizer from information on tag or container. 1 2 3 K Verification	05.05 Identify symptoms of nutritional deficiencies of plants. 1 2 3 K Verification	05.06 Collect a soil sample for soil analysis. 1 2 3 K Verification
05.07 Determine the fertilization requirements of plant materials. 1 2 3 K Verification	05.08 Determine a fertilizer schedule. 1 2 3 K Verification	05.09 Apply fertilizer and soil amendments. 1 2 3 K Verification
05.10 Apply special fertilization methods appropriate to a region or plant group. 1 2 3 K Verification	05.11 Determine the rate of fertilizer applications. 1 2 3 K Verification	05.12 Recognize the symptoms of fertilizer burn. 1 2 3 K Verification

05.13 Clean and store the fertilizer-application unit. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	05.14 Maintain fertilization records. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

06.0 IRRIGATE PLANTS AND TURFS.

06.01 Identify the water needs of plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.02 Identify irrigation components and types of systems. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.03 Identify sources of water for irrigation. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
06.04 Install irrigation systems with control valves and clocks. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.05 Install a drainage system. Identify drainage components for different types of drainage systems. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	06.06 Irrigate plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
06.07 Repair irrigation systems. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

07.0 CONTROL PESTS.

07.01 Classify insects according to their feeding habits. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.02 Identify common insects and diseases of plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.03 Describe life cycles of common pests of plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
07.04 Describe methods (biological, chemical, and cultural) of controlling plant pests. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.05 Report insect and disease damage. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.06 Interpret information on a pesticide or agricultural chemical label. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
07.07 Interpret and use the spray-compatibility chart. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.08 Comply with local, state, federal, and EPA regulations regarding pesticide use. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.09 Select, mix, and apply pesticides according to the product label. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
07.10 Clean, adjust, and calibrate spray equipment. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.11 Store and dispose of pesticide containers legally. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.12 Maintain pesticide records. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
07.13 Describe symptoms of pesticide poisoning and identify the first aid required. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.14 Determine the appropriate time to apply chemicals. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	07.15 Select and identify pesticides according to the controlling action (stomach, contact, systemic) of each. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

08.0 DEMONSTRATE PRUNING SKILLS.

08.01 Identify methods of pruning plants to achieve desired growth and maintain health. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.02 Identify and select pruning tools for the task. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.03 Identify the appropriate time to prune plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
08.04 Root-prune appropriate plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.05 Prune plants for desired shape and growth. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	08.06 Identify and select chemical growth regulators. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
08.07 Identify means of sterilizing pruning tools. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

09.0 HARVEST, TRANSPORT, AND INSTALL PLANT MATERIALS.

09.01 Select and prepare field-grown and container plants for transportation and transplanting. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	09.02 Determine the requirements for preserving plant viability. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	09.03 Install ornamental plants per a landscape plan. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

10.0 OPERATE, REPAIR, AND MAINTAIN TOOLS AND EQUIPMENT.

10.01 Identify, operate, and maintain small gasoline engines. 1 2 3 K — Verification

10.02 Identify, operate, and maintain hand tools and power tools. 1 2 3 K — Verification

10.03 Perform a pre-operational check of equipment before use. 1 2 3 K — Verification

10.04 Identify, operate, and maintain a tractor and power equipment. 1 2 3 K — Verification

10.05 Load, secure, and transport equipment. 1 2 3 K — Verification

10.06 Demonstrate safety precautions while working with tools and equipment. 1 2 3 K — Verification

10.07 Maintain equipment maintenance and service records. 1 2 3 K — Verification

1 2 3 K — Verification

1 2 3 K — Verification

1 2 3 K — Verification

1 2 3 K — Verification

1 2 3 K — Verification

11.0 KEEP RECORDS.

11.01 Keep fertilizer- and pesticide-application records. 1 2 3 K — Verification

11.02 Keep equipment-maintenance and service records. 1 2 3 K — Verification

11.03 Keep job records, daily log sheets, and inventory. 1 2 3 K — Verification

1 2 3 K — Verification

1 2 3 K — Verification

1 2 3 K — Verification

LANDSCAPE OPERATIONS

12.0 DEMONSTRATE EMPLOYABILITY SKILLS.

12.01 Conduct a job search. 1 2 3 K Verification	12.02 Secure information about a job. 1 2 3 K Verification	12.03 Identify documents that may be required when applying for a job. 1 2 3 K Verification
12.04 Complete a job-application form correctly. 1 2 3 K Verification	12.05 Demonstrate competency in job-interview techniques. 1 2 3 K Verification	12.06 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other persons. 1 2 3 K Verification
12.07 Identify acceptable work habits. 1 2 3 K Verification	12.08 Demonstrate knowledge of how to make job changes appropriately. 1 2 3 K Verification	12.09 Demonstrate acceptable employee health habits. 1 2 3 K Verification
1 2 3 K Verification	1 2 3 K Verification	1 2 3 K Verification

13.0. DESIGN AND SELL LANDSCAPE PROJECTS (LANDSCAPE AND INTERIORSCAPE).

13.01 Confer with customer regarding special requests and needs. 1 2 3 K Verification	13.02 Analyze the environmental conditions of the site for the project. 1 2 3 K Verification	13.03 Identify plant materials appropriate for the project. 1 2 3 K Verification
13.04 Determine the desired effect and purpose of the project. 1 2 3 K Verification	13.05 Design the project. 1 2 3 K Verification	13.06 Present the design. 1 2 3 K Verification

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

14.0 PREPARE ESTIMATE AND ESTABLISH CONTRACTS.

14.01 Develop a list of materials required for the project. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	14.02 Determine equipment needs. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	14.03 Estimate time and work hours. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
14.04 Determine costs of materials, equipment, and labor. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	14.05 Prepare for the customer a price based on specifications. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	14.06 Establish the terms of a contract. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

15.0 ANALYZE AND ORGANIZE THE PROJECT.

15.01 Interpret plans and specifications. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	15.02 Identify safety requirements. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	15.03 Organize site preparation. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
15.04 Locate project materials. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	15.05 Determine personnel needs. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	15.06 Determine equipment needs. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification

15.07 Establish a project schedule. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

16.0 LAY OUT AND INSTALL LANDSCAPE AND INTERIORSCAPE.

16.01 Locate existing utilities. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	16.02 Rough grade the site. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	16.03 Determine procedures for installing large materials. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
16.04 Install an irrigation system. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	16.05 Describe procedures for constructing hardscape (walls, walks, patio, drives, etc.). 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	16.06 Lay out and install plants. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
16.07 Prepare the interiorscape. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	16.08 Prepare the final grade. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	16.09 Install lawns and turfs. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification
16.10 Install mulch and perform final cleanup. 1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

17.0 MAINTAIN LANDSCAPES AND EQUIPMENT.

17.01 Determine water requirements and apply water at proper rates. 1 2 3 K _____ Verification	17.02 Identify weeds and apply herbicides safely. 1 2 3 K _____ Verification	17.03 Determine fertilization requirements and apply fertilizer at proper rates. 1 2 3 K _____ Verification
17.04 Identify plant pest problems and apply corrective measures. 1 2 3 K _____ Verification	17.05 Trim and prune landscape plants. 1 2 3 K _____ Verification	17.06 Maintain turf viability: mow at proper height and frequency; aerate, edge, and clip turf; and remove trash. 1 2 3 K _____ Verification
17.07 Cultivate and mulch plants. 1 2 3 K _____ Verification	17.08 Brace and repair trees. 1 2 3 K _____ Verification	17.09 Provide protection for plants from adverse weather conditions. 1 2 3 K _____ Verification
17.10 Select, operate, and maintain landscape equipment. 1 2 3 K _____ Verification	17.11 Comply with local, state, and federal regulations regarding landscape. 1 2 3 K _____ Verification	17.12 Demonstrate sanitation and safety practices when maintaining landscape. 1 2 3 K _____ Verification
1 2 3 K _____ Verification	1 2 3 K _____ Verification	1 2 3 K _____ Verification

18.0 MAINTAIN CUSTOMER RELATIONS AND OBSERVE FOLLOW-UP PROCEDURES.

18.01 Conduct walk-through of project with client to assure satisfaction. 1 2 3 K _____ Verification	18.02 Identify current and future maintenance requirements. 1 2 3 K _____ Verification	18.03 Analyze project records for profitability and employee performance. 1 2 3 K _____ Verification

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

COOPERATIVE WORK EXPERIENCE COMPETENCIES.

1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification
1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification	1 ☐ 2 ☐ 3 ☐ K ☐ Verification

LANDSCAPE OPERATIONS

VERIFICATION

Each instructor who rates this student on competencies in this MAP should fill in one of the boxes below.

Initials _____

Signature _____

Title _____

School Name _____

School Address _____

Initials _____

Signature _____

Title _____

School Name _____

School Address _____

Initials _____

Signature _____

Title _____

School Name _____

School Address _____

COOPERATIVE WORK EXPERIENCE

In addition to classroom training and laboratory performance identified on the Career MAP, this student has participated in cooperative work experience with employers, as shown below.

Dates _____ Employer _____

Employer's Address _____

_____

Supervisor _____

Supervisor's Title _____

Dates _____ Employer _____

Employer's Address _____

_____

Supervisor _____

Supervisor's Title _____

Dates _____ Employer _____

Employer's Address _____

_____

Supervisor _____

Supervisor's Title _____

NOTES

This section of the MAP is provided for the instructor, employer, or student to list additional qualifying statements or other pertinent information. All comments should be initialed for verification.

This public document was promulgated at an annual cost of $000.00, or $00.00 per copy, to display the intended outcomes and student performance standards of a vocational program and to provide a document for teachers to record student levels of achievement.

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